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THE EFFECT OF TASK AND PERSONAL RELEVANCE ON CREDIBILITY
JUDGEMENTS WHILE SEARCHING ON THE INTERNET

by

ANDRIUS VIKTORAS KIRKYLA

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ABSTRACT OF THE DISSERTATION

The Effect of Task and Personal Relevance On Credibility Judgments While Searching
on the Internet

By ANDRIUS VIKTORAS KIRKYLA

Dissertation Director:
Professor Daniel O'Connor

People can view the Internet as an endless source of information although it is not known how individuals might evaluate the credibility of information that is presented on websites. A methodology is needed to incorporate how the information seeking task, as well as the level of personal relevance, influences the criteria individuals use to evaluate Internet information. Forty subjects completed four search tasks with two of the tasks in topic areas where subjects had a high level of interest and the other two tasks in areas where subjects had a low level of interest. For each of the topic areas the subjects were asked to complete one fact finding task and one task that required more in-depth analysis. The results revealed that there are four factors explaining the subjects' credibility judgments: competence, coverage, presentation, and trustworthiness. Results of logistic regression suggest that the complexity of the task influences the factors used in judging the credibility of information being presented. However there appears to be no relationship between the levels of personal relevance and criteria used to judge credibility. A revised model is proposed that incorporates the four factors and illustrates how they are used in evaluating credibility.

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Chapter 1 Introduction and Problem Statement

1.1 Overview of this study

Information on the Internet is expanding at a tremendous rate with a concomitant increase in the number of individuals relying on this resource. Critical to this process is an assessment of the factors users take into account when evaluating the information presented on a website. In its most basic structure, this problem encompasses three main criteria: how a user evaluates the credibility of information in a website in general, how that person links the complexity of a task to his or her evaluation of the credibility of website information, and finally how an individual's personal relevance in the information seeking topic influences credibility judgments. Several researchers have developed theories of how users evaluate information on the Internet (Reih 2002, Wathen and Burkell 2002), and more recent research incorporates how the task or topic influences users' evaluations of the information sought and retrieved (Li and Belkin 2008). Other researchers have chosen to focus on specific topic areas such as health (Hong 2006) and commercial websites (Pavlou and Gefen, 2004); yet, it is not known how different types of tasks might alter the criteria that individuals use while making credibility judgments. Marchionini (1989) and Byström and Järvelin (1995) were among the researchers who have studied the effect of task on information seeking behavior. Marchionini studied how task affects young users completing an information seeking need using an online database. Byström and Järvelin attempt to show how different tasks cause users to seek different sources and use different criteria when evaluating information. This dissertation will attempt to develop a framework for evaluating the credibility of information that is

being presented on the Internet. This framework will be evaluated across several topic areas and several information seeking tasks.

1.2 Purpose of study

- To explore how users incorporate credibility when engaging in an information seeking task on the Internet.
- To explore how the complexity of the user's task influences the perceived credibility of the information that is presented on the Internet.
- To determine how an individual's level of interest in the topic relates to the credibility judgments that person makes while evaluating information presented on the Internet.

1.3 Problem Statement

The construct or concept of credibility has been studied in such various disciplines as communication, psychology, and information science (Rieh and Danielson 2006). Credibility can be viewed as an aspect of relevance which has received much attention in basic information retrieval research (Saracevic 2007). Given the widespread study of credibility it is often difficult to isolate an agreed upon working definition of the credibility construct. Understanding this construct has been noted as important because it is likely a primary goal of people seeking information. It might be posited by asking a contraindicated question: How many users set forth a goal of finding non-credible information?

According to Wilson (1983) there are two main components of credibility: competence and trustworthiness. Competence is being able to demonstrate proficiency in a given area and trustworthiness is the ability to provide information that is not

intentionally misleading. While these descriptions provide a useful understanding of the terms, it is important to observe how people evaluate information and determine its credibility. In order to evaluate these components Rieh and Danielson (2006) state that users evaluate three factors: the source of the information (source credibility), the content and presentation of the information (message credibility), and the media through which the message is being presented (media credibility). Trustworthiness can also be defined as being honest and ethical (McCroskey and Teven 1999).

It is assumed that prior to making a credibility judgment an individual must have an information seeking need. Dervin (1983) describes an information need as a gap between a user's knowledge and their desired state. According to Taylor (1962) an information need is something that is distinct and traceable. In order to fulfill this gap an individual engages in information seeking behavior to find the information that he or she need. This behavior is influenced by both the level of personal relevance that the individual has in the subject area of the information need, as well as the complexity of the information need. Belkin (1980) noted that the process of searching for and retrieving information created a fluid state where a change in the original information need can occur.

Several conceptual models have been developed to explain how individuals evaluate information that is presented to them. Wilson (1983) introduced the concept of cognitive authority. According to Wilson individuals grant cognitive authority to those information sources that he or she deem to be both competent and trustworthy. Researchers such as Fritch and Cromwell (2001) and Reih (2002) have demonstrated how

individuals might use cognitive authority to construct credibility judgments with information obtained from the Internet.

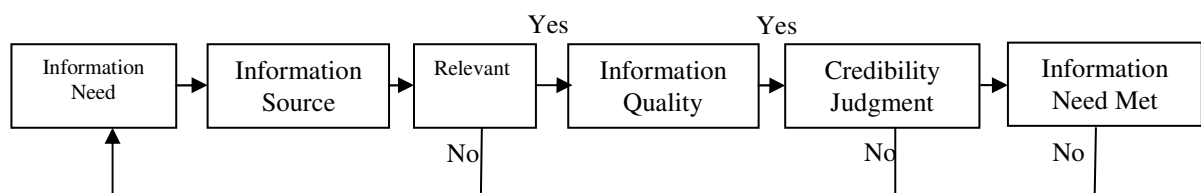
Petty and Cacioppo (1986) developed the Elaboration Likelihood Model (ELM) to determine how attitudes are changed. According to the ELM there are two main routes—the central and the peripheral—through which an individual evaluates information that is presented to them. The central route focuses on the source of the information while the peripheral route focuses on the presentation of the information. Fogg (2003) incorporated the ELM while developing the prominence-interpretation theory explaining how individuals evaluate credibility in an online setting.

The results of this dissertation might allow for a better understanding of the factors that individuals focus on when attempting to link their assessments of credibility to the usefulness of the information retrieved. In addition, content, the presentation of information, personal relevance, and task can be calibrated to assess their influences on credibility judgments.

1.4 Relevance versus Credibility during Information Seeking Tasks

Prior to discussing how individuals evaluate credibility on the Internet it is important to discuss how relevance affects credibility. The diagram below illustrates the process that an individual goes through when evaluating the credibility of an information object that is found on the Internet.

Figure 1.1: Information Seeking Process



The box to the far left refers to the information need that the individual is attempting to fulfill. In order to fulfill this need an individual will choose an information source in which to find the information that he or she is seeking. Several factors determine which information sources an individual will use when completing an information seeking task: ease of use, time constraints, and prior experience with the information source are some of these (Simon 1976).

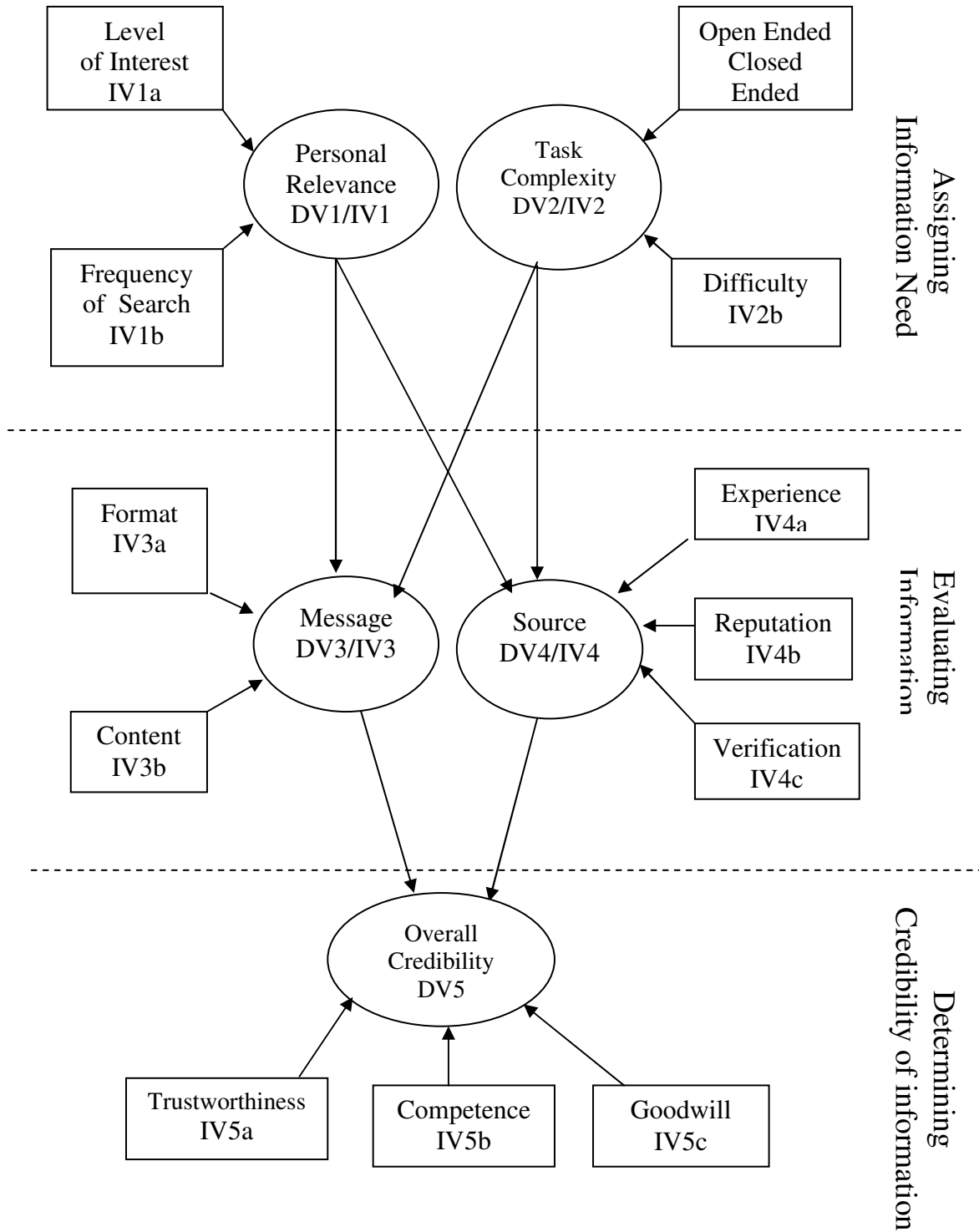
While the rectangles refer to the steps that an individual completes in order to fulfill an information need, it is not necessary that they be completed in the order presented. For example if the individual believes that an information object is of dubious quality, he or she may not make a relevance judgment. After the information source delivers an information object, the individual makes a judgment about whether the information presented is relevant. An information object is considered relevant if it is pertinent to the information need at hand. Pertinent refers to whether the information presented is topical to the user's information seeking need. There are several criteria individuals use when evaluating the relevance of information presented. If the individual determines that the information is relevant then he or she will evaluate the quality of the information that is being presented; otherwise the individual may return to an earlier part of the search process and reformulate the original query or select different information sources.

If the individual finds the quality of the information presented as valuable, then that person may attempt to make a credibility judgment. The information is considered valuable to an individual if it helps him or her complete the information seeking task.

Valuable differs from pertinent in that it is possible for a piece of information to be pertinent but not valuable. For example, a piece of information may be topical but the individual may already know the information and thus not be valuable. It is important to note that there are several steps that an individual will complete prior to making a credibility judgment on a retrieved information object. It is at this point that the proposed model used in this investigation will attempt to determine how individuals evaluate the credibility of information presented on the Internet. After deciding that the information object is credible the individual can then decide if the original information need is met. If the individual believes that the information need is met then he or she may end the search. As noted earlier, as information is obtained, it can act to then change the individual's need. Belkin (1980) states that individuals engaging in an information seeking task are often in an anomalous state of knowledge in which they are not sure of the information needed in order to fulfill that need. If after determining that an information object is credible an individual may decide that more information is needed; in such cases, the person may then engage in a new information seeking task.

1.5 Preliminary Model

Figure 1.2 Preliminary Model



The model above demonstrates how an information seeking task and personal relevance influence an individual's credibility assessment when attempting to satisfy an information need using the Internet. There are three stages in this model: assigning the information need, evaluating the information, and determining the credibility of the information object. The ovals in the above model represent variables that are dependent variables in one stage but become independent variables in future stages. The rectangles refer to variables that are only independent variables. The directed lines refer to the relationships between independent and dependent variables.

The first stage of the model is assigning the information need. The information need is composed of the task that needs to be completed and the level of personal interest that the individual has in satisfying the information need. The oval to the right refers to the task that the individual is engaged in. The task is dependent on the open/closeness of task as well as the perceived difficulty that the individual has in completing the task. Open tasks are those tasks that are subjective in nature and are likely to have multiple outcomes. Closed tasks on the other hand tend to be objective in nature and have a more limited number of outcomes (Kim and Allen 2002). Since both the inputs and outputs required to complete an open task are more numerous and unknown than for a closed task, they are more complex than closed tasks. In addition, tasks that are perceived by the individual as more difficult will also be viewed as more complex.

The oval to the upper left refers to the personal relevance that the individual has to a given topic being searched. Personal relevance is influenced by the level of interest that an individual has in a given topic, as well as, how often the individual seeks information on a given topic. It is hypothesized that the higher the level of interest an

individual has in a given topic, the more personally relevant that topic will be for the individual. The more frequently an individual searches for a topic the more likely that topic will be of high personal relevance to the individual. The next stage of the model is evaluating the information object presented to the individual. Both personal relevance and task complexity influence the criteria individuals use in order to evaluate the credibility of the information object presented. The oval to the right refers to the source of the information object. Individuals use the following components to evaluate the source of an information object: prior experience with the source, the reputation of the source, and the ability to verify the information presented by the source. From this, it might be hypothesized that if an individual has had a previously satisfactory experience with a website then that person might be more likely to view the information presented in the website as credible. Reputation refers to how credible a person thinks a piece of information is based on the recommendation of a third party. Users are more likely to view an information source as credible when it has been validated by a trusted third party. This validation can be either explicit or implicit. Explicit validation occurs when the individual is familiar with the recommender such as a friend who recommends a specific website. Implicit validation occurs when the individual is unfamiliar with the recommender but still values the link from one source to another. An example of implicit validation may be a hyperlink to an unknown website from a trusted website. Verification refers to the ability to validate website information independently. Verification can allow users to reduce source ambiguity. If an individual is able to validate the information on a website independently, then he or she is more likely to view that information as credible (Burbules 2001).

The message oval refers to the information that the website contains. There are two main components users incorporate when evaluating the message presented on the website: format and content. Format refers to the way the information is presented. If the information is presented in a professional manner individuals are more likely to view the information as credible. The content of the message refers to the actual information presented; in order for individuals to view the content as credible it must be topical, timely and comprehensive (Liu 2007).

The last stage of the model is determining the credibility of the information object. When evaluating overall credibility individuals factor in both the message and source credibility of the information object. Overall credibility is determined by the following components: competence, trustworthiness, and goodwill (Wilson 1983, Burbules 2001). The first component is competence. As mentioned previously, competence is how authoritative the individual views the information presented. This is related to source credibility. Trustworthiness refers to how honest the individual believes the website is. Goodwill refers to how the individual perceives the intent of the website. Individuals are more likely to find information as credible if they believe that the presenter has the user's best interest in mind.

1.6 Structure of Dissertation

The remainder of this dissertation will start with a literature review. The review will focus on credibility as a construct. In addition frameworks for evaluating credibility will be introduced. The Elaboration Likelihood Model (Petty and Cacioppo 1986) will be discussed. In addition the Prominence Interpretation framework which incorporates the ELM into the evaluation of websites will also be assessed. The role of task will be

discussed as well as how personal relevance affects user credibility judgments. Chapter 3 presents a conceptual framework that incorporates both task and personal relevance when evaluating the credibility of information presented on the Internet. Chapter 4 presents an experimental design that will be used to evaluate the proposed model. The results of the study will be presented in Chapter 5. Chapter 6 will elaborate on the key findings and provide directions for future research. The final chapter concludes with the significance of the results and their implications.

Chapter 2 Literature Review

There are multiple steps that an individual can partake in prior to evaluating the credibility of an information object. This literature review will address the following questions.

- How is the credibility judgment of an information object related to the relevance judgment assigned to that object?
- What are the dimensions of credibility and how have they been represented in prior studies?
- How does information quality affect the credibility judgment individuals assign an information object in general, and information objects on the Internet in particular?
- Lastly, how is the concept of task used in Information Science and how can it be incorporated in the study of credibility?

2.1 Relevance

Relevance has been an area of great interest in Information Science. Spink and Saracevic (1997) developed an interactive framework that can be applied to the Internet. According to Saracevic (1996a) relevance is defined as “an attribute or criterion reflecting the effectiveness of interactive exchange of information between people, and information systems in communicative contact (p.210)”. From this, it can be extended that relevance is multidimensional and context specific. What may be relevant to a user in one context may be of little use in another. Prior to being able to make a credibility

judgment, the information must be appropriate to the information need a user is attempting to fulfill.

Before being able to validate the credibility of an information object, the individual must have access to it. System relevance refers to the relationship between the query that the user enters into a given system and the information objects that are retrieved by the system (Saracevic 1996). In an online environment, issues of search engine bias may affect how an individual evaluates the relevance of the information that is retrieved (Vaughan and Thelwall 2004). Thus, if an object is not visible to an individual he or she may not make a credibility judgment on it. If the individual perceives the information that is returned by the system as relevant he or she is more likely to trust the system (Marsh and Dibben 2003).

One of the first judgments an individual makes regarding an information object is whether it is topical to the information need that the individual is attempting to fulfill. Topical relevance refers to the relationship between the subject of the query that has been entered and the information objects that are retrieved (Saracevic 1996). While topicality is considered an important component of relevance, researchers found that it is not the only consideration. Xu and Chen (2006) found that issues such as novelty, reliability, and understandability also affect individual relevance judgments. Novelty refers to the extent that the information presented in an information object is new to the individual. Reliability is defined as the degree to which the individual finds the information presented in the document to be true and accurate. Understandability refers to how clearly the individual comprehends the information that is being presented in the information object that is being evaluated.

Related to topical relevance is how the information object presented to the individual conforms to the individual's present state of knowledge. Cognitive relevance refers to the relationship between the state of knowledge of the individual and the cognitive need that the individual needs to fulfill (Saracevic 1996). Accordingly Belkin (1980) proposed that an anomaly occurs when there is a gap between what an individual knows about a given topic and what he or she needs to know in order to complete a given task. Criteria that users employ to evaluate cognitive relevance include the quality of the information presented and the fit of the information with regards to the information need. If the information object is able to fulfill a gap in the user's mental model, the individual is more likely to view it as cognitively relevant.

Situational relevance refers to the relationship between the information object and the task that the user is trying to complete. Ingwersen (1996) provides a framework in which the individual's task influences how the user judges the relevance of an information object. If an information object is able to help the user complete his or her task then he or she is likely to view the object as relevant. It is important to note that what is relevant in one context may not be relevant in another. In addition the cognitive nature of the individual affects the situational relevance of an object. If an information object is able to fulfill a cognitive need of a user, while at the same time helping the individual complete a task, then it will be relevant to the user.

Lastly, motivational relevance refers to how driven the individual is in completing a task and how this influences his or her relevance judgments of information objects. Motivational relevance is determined by the relationship between the intents and goals of the individual and the information objects that the user evaluates (Spink et al. 1998). The

level of motivation that an individual has in completing a task will determine the cues that he or she will focus on when attempting to evaluate the credibility of information that is presented to them.

Cosijn and Ingwersen (2000) suggest that affective relevance is not the same as motivational relevance. The authors maintain that affective relevance should be viewed as a component of relevance that is incorporated by all other manifestations of relevance. In addition Cosijn and Ingwersen suggest that any model of relevance should include a socio-cognitive relevance that is highly context specific. This socio-cognitive relevance should be highly influenced by the stage of the information seeking process that the individual is engaged in. In addition, the specific task that the individual is engaged in will also affect how they determine the affective relevance of a given information object.

2.2 Criteria for judging relevance

There are several criteria that individuals incorporate when attempting to determine whether a piece of information is relevant. These criteria include the following: content, source presentation, search stage, and the level of interest that an individual in the topic. Table 2.1 summarizes the findings of selected relevance studies.

Table 2.1 Relevance Studies Summary

Relevance Criteria	Barry (1994)	Cool et al. (1993)	Wang & Soergel (1999)	Xu (2007)	Taylor et al. (2007)
Content	Depth, Accuracy, Clarity, and Novelty	Usefulness, Age, Focus	Timeliness, Topicality	Topicality, Scope	Clarity, Ability to Understand
Source	Source quality, External verification	Authority	Authority, Credential	Reliability	Authority, Novelty
Presentation		Organization, Understandability			Clarity
Situation	Time constraints		Reading Time	Search Type	Information seeking stage

Content refers to the actual information that is contained in a document.

According to Barry (1994) the following factors affect how individuals determine whether the content of a particular information object is relevant to fulfilling an information need: depth, accuracy, clarity, and novelty. Depth refers to how much coverage the information object provides to given topic. The more comprehensive a document is, the more likely a user is the more likely a user is to judge it as relevant, since it will be able to fulfill the information need. Accuracy refers to how correct the individual thinks the information is. Clarity refers to how easily the individual is able to understand the information that is presented. Individuals are more likely to find an information object relevant if they are able to easily understand the information presented. Lastly, novelty refers to how original the information presented is to the individual. Individuals are more likely to find an information object as relevant if it

provides a new dimension to the problem then if it just rehashes information that is already known.

Both timeliness and topicality also affect how individuals determine the relevancy of the content of an information object (Wang and Soergel 1999). The more recent a piece of information is, the more likely the individual is to view the information as relevant; this is especially true in areas where information is known to change quickly. Topicality refers to how closely the information presented in a document corresponds to the actual information need of the individual. The greater the overlap between the two the more likely it is that an individual is to judge the document as relevant.

Source relevance refers to the individual or organization that is responsible for the information or content that is being presented. When evaluating the source, individuals focus on several factors. Cool et al. (1993) maintains that authority is one of the factors that individuals use in order to judge the relevance of an information object. Individuals are more likely to find a piece of information relevant if it comes from a source that they believe to be authoritative. The ability to independently verify the information presented is also important when evaluating a source (Barry 1994). Individuals are more likely to find information relevant if they are able to externally validate it. This is especially important on the Internet where the ability to provide hyperlinks to external documents allows individuals to easily verify the information that is being presented. Lastly how an individual perceives the reputation of an information source affects how relevant an information object may be (Wang & Soergel 1999). Individuals are more likely to find an information object to be relevant if the individual believes that the source is reputable.

Presentation refers both the format of the information object and how the information is organized. Cool et al. (1993) maintain that the organization of a document affects how individuals judge its relevance. Users are more likely to judge a document as relevant if it is well organized and they are able to easily find the information they are looking for. The authors also maintain that understandability influences how individuals rate the relevance of an information source. Individuals are more likely to consider an information source as relevant if they are easily able to understand the information presented.

The situation that the individual finds himself or herself in also influences how he or she arrives at relevance judgments. Xu (2007) maintains that individuals typically engage in two types of information searches: epistemic and hedonic. Epistemic information searches refer to those searches that are used to solve an immediate need or problem. Hedonic information searches refer to those searches that are done for leisure or fun. Xu found that novelty is more important when engaging in a hedonic search. Scope, however, is more important to the user when engaging in an epistemic information need.

The stage that an individual is at during the information seeking search also affects how an individual evaluates the relevance of an information object (Taylor et al. 2007). For example, during the early stages of an information search an individual is more likely to rely on the content of a document when evaluating its relevance. In addition, Taylor et al. found that when individuals were selecting a topic to research they were more likely to evaluate how interesting a document is when evaluating its relevance.

2.3 Credibility

Credibility has been studied across several disciplines (Rieh and Danielson 2006). Researchers have determined that in order for a piece of information to be deemed credible the individual encountering the information must agree that the information is both trustworthy and believable (Wilson 1983). Fogg and Tseng (1999), in their research have substituted believability for the broader term of competence. Competence requires that the information be both believable, as well as, coming from an authoritative source. Other researchers have added that in addition to trustworthiness and believability the person evaluating the source of the information must also believe that the presenter of the information must have the goodwill of the user in mind. In order to evaluate the overall credibility of a website, individuals focus on two main components: the source of the website and the content provided in the website.

In order to find a source of website credible individuals must trust the website's author. According to Friedman et al. (2000) there are several factors that individuals use when determining if they can trust a particular website: language, accountability, insurance, anonymity and informed consent. Language refers to the whether the text on the site is comprehensible to the user. In addition Fogg et al. (2003) maintain that it is important for web developers to avoid such pitfalls as typographical errors and inappropriate grammatical errors.

Accountability refers to the ability for the user to identify who is responsible for the content that is being provided (Friedman et al. 2000). Kittur et al. (2008) demonstrated that individuals found Wikipedia entries more trustworthy when they were able to determine who made the changes and when they occurred. In addition individuals

found they trusted entries more when they were able to view the complete history of the revisions posted to the entry.

Insurance refers to social arrangements that websites provide their users in order to compensate users for any damage that may occur during an interaction (Friedman et al 2000). Insurance is especially important when individuals interact with e-commerce sites. Individuals are more likely to trust sites when they perceive there is little risk to them when interacting with a website.

Anonymity and informed consent are two closely related concepts that influence an individual's trust in a website. Informed consent refers to whether a website should put cookies on a user's personal computer. Cookies are small pieces of code that allow a website to track an individual's browsing behavior. Cookies can be made to expire at the end of a user's browser session or can be permanently added to a person's computer so that the information can be retrieved for future use. Anonymity refers to the absence of identifying information while engaging with a website. These two concepts are at loggerheads with one another. Any cookie that is used by a website will inevitably lead to a loss of anonymity by the user. However, Marsh and Dibben (2003) state that individuals are more likely to trust systems that are tailored to their individual needs. This tailoring requires that the individuals give up a certain amount of anonymity.

Source credibility can be divided into four types; presumed credibility, reputed credibility, surface credibility, and experienced credibility. Presumed credibility is based on the general assumptions held by a user. For example, people are more likely to trust family members than strangers (Danielson 2006). Reputed credibility refers to how credible a person thinks a piece of information is, based on the recommendation of a third

party. For instance, a person might find a political candidate credible based on a newspaper endorsement. Surface credibility is based on a superficial examination of the information. If a text has a lot of spelling mistakes it is unlikely that it will be viewed as being credible by users. The last type of source credibility is experience credibility. Experience credibility is based on an individual's experience with an information source over a long period of time. For example, users who find a particular website helpful are more likely to return to the website in the future in order to satisfy an information need. Presumed and reputed credibility can be collapsed into how the user perceives the reputation of the source presenting the website; both are based on the preconceived opinions of the individual to the given source of information. In addition, surface credibility is incorporated into message credibility since it is a subpart of how the overall website is developed.

Liu (2004) maintains that an author adds to a website's source credibility through the following; affiliation with prestigious institution, being known as an expert in the field, and having a previous publication in the field. In addition, Danielson (2006) found that in order for an individual to establish credibility it is important for a user to be able to easily identify who has presented the information, as well as, a means of contacting the individual. An author may add to the site's reputed credibility by having professional titles identifying the individual's area of expertise. For example, a doctor will add credibility to a health care site.

When evaluating the reputation of a website's author individuals use several filters (Fritch and Cromwell 2001). Author filters are those that identify how credible the individual the views the author. Individuals may be interested in the credentials that a

website author may have. Individuals may also judge the credibility of the website author by determining whether the author is affiliated with any organizations that the individual deems credible. Institutional filters are those filters that evaluate the institution that is responsible for presenting the website. As is shown below, this credibility is evaluated both on the information presented as well as the information omitted.

One factor that adversely affects the credibility of information presented on a website is the inability to determine who is responsible for the content provided. Source ambiguity, the inability to properly identify creator of content, (Danielson 2006) can affect the perceived credibility of the information that is presented in a website. Burbules (2001) maintains that one of the difficulties in evaluating information on the web is that it is difficult to find an independent source of validation for the information provided. There are three main reasons for source ambiguity. The first reason is that information is shared from a common source but is presented in two different sites; if both sites got the information from the same original source then validating the facts on one site with the other site will be of little use. The second reason for source ambiguity is that sources referenced on a website by hyperlinks may not exist any longer; making it difficult for individuals to independently verify the information. Goh et al. (2007) found that around fifty percent of the web links cited in Information Science articles were unavailable after five years. These results confirm earlier findings by Casserly and Bird (2003) that stated that over forty percent of cited links are unavailable in five years time. The final cause for source ambiguity is that it is rare that one website contains all the information needed by an individual to complete a given task. In order to complete an information seeking task an individual needs to go to several sources in order to gather all the information

necessary; he or she then needs to reconcile any differences and, if possible, validate the information independently. Bhavnani (2005) demonstrated that no one source had all the information to establish a basic understanding concerning skin cancer.

In addition to evaluating the source of the information presented on a website, individuals are also interested in the content when evaluating credibility. Message credibility is comprised of both the content of the message and how it is presented. The credibility of a website's content can be measured through the following constructs: trust authority, aboutness, re-visit, and recommend (Toms and Taves 2004). Trust authority refers to the degree of authoritativeness granted a particular organization or author; for example, universities are often assigned a high degree of trust by many users. Aboutness indicates the extent to which the information is relevant to the individual's information seeking task. Saracevic (2007) defines information as being relevant if it helps the user to fill an information need in a given context. Tom and Taves define the construct of re-visit as the likelihood that an individual will return to a particular website in the future in order to satisfy an information need. Individuals are more likely to return to a website that they find credible. The construct of recommend refers to the probability that a user will recommend the website to other individuals. Individuals are only likely to recommend information sources that they find credible to other individuals.

The quality of the information provided influences the overall message credibility. According to Wang and Strong (2006), there are four categories that contribute to the overall information quality of the content of a message: the accuracy, relevancy, representation, and accessibility. Wang and Strong believe that the accuracy of the data in a document is primarily arrived at through the believability, objectivity, and

reputation of the data provider. These factors are similar to the factors that Rieh and Danielson (2006) state contribute to the source credibility of an information item. Wang and Strong (1996) define relevancy as “being appropriate to answering the question at hand” (p 10). According to the authors, the relevancy of an information object is influenced by such factors as the value-added that the new piece of information delivers to the user, the timeliness of the data, and the amount of coverage a particular source of data provides. With respect to timeliness the authors believe that the more recent a piece of relevant data is the higher the quality. The depth of data is related to the task that the user is attempting to complete; some tasks require just a cursory amount of information in order to be completed. For example, looking up the definition of a word in an online dictionary requires only that a satisfactory definition be provided. However, other tasks might require that the information provided be more in-depth. When users are seeking information on health related issues, typically, the more in-depth the information being provided the better. According to the authors representation is a combination of interpretability, ease of understanding, representational consistency, and conciseness of representation (Wang and Strong 2006). Interpretability is defined as the ability of the user to easily interpret the data in the context in which it is provided. For example, when looking at the price of an item on a website, users would expect the prices to be listed in the local currency. Representational consistency refers to the fact that the data be presented in a consistent manner throughout the presentation. Concise representation refers to the fact that the information is presented in such a format that there is very little irrelevant information presented. Wang and Strong’s definition of representational quality is directly related to message quality as described by Rieh and Danielson (2006).

Other factors that influence the credibility of content of a message are timeliness and validation. Wathen and Burkell (2002) maintain that the more up-to-date the information appears to be on a website, the more credible that it may appear. Information validation can occur through several means. One way to validate information is to provide a hyperlink to other sources of information. McInerney (2000) emphasizes that it is necessary to ensure that the hyperlinks on a website are maintained in order to direct the users to the correct information source. As previously discussed, if the links become outdated then users are likely to view the information presented as being less credible. Another way to validate the accuracy of the information on a website is to have it certified by an outside source. According to Fallis (2004), websites that display the “Health on the Net Foundation’s” logo are more likely to contain accurate health information than those who do not. In addition, information presented on a university’s website is likely to be considered reliable (Rieh 2002).

The presentation of the message also effects how credibly will be perceived. Tombros et al. (2005) maintain that factors such as layout and the use of images affect a website’s credibility. Robins and Holmes (2007) demonstrated how sites that were more aesthetically pleasing were viewed as more credible than sites that were less aesthetically pleasing, given the same content. Kensicki (2003) showed that sites that contained images were perceived as being more credible than those that do not. However, use of graphics must be appropriate to the content; Wathen and Burkell (2002) found that inappropriate animation or graphics will reduce a website’s credibility.

2.4 Information Quality

Credibility is likely at the heart of information seeking tasks, as discussed before, a user seeks out information that he or she can perceive as accurate, however, there are other factors that influence a user's experience with information in an information seeking task. These factors can be referred to as information quality. For the purposes of this paper, information quality refers to the usability of information found for a specific task by a user. As the name implies, information quality refers to the information being presented, ideally it should be media independent; however researchers have shown that it is influenced by the media in which it is presented (Johnson & Kaye, 2004). This is of particular importance in understanding website design because it affects a user's experiences with the website, in other words it influences the website quality. For the purposes of this paper, website quality refers to usability of a website's information for a specific task by a user. Several researchers have attempted to apply the research in information quality to the study of website quality (Alexander & Tate, 1999; Brandt, 1996; Rieh & Belkin, 1998). This section will briefly highlight some of the empirical underpinnings of the research in information quality and how they are applied to website quality research.

According to Wang and Strong (1996), the accuracy, relevancy, representation, and accessibility contribute to the overall information quality of an information object. (These factors are similar to the factors that Rieh and Danielson (2006) state contribute to credibility.) Wang and Strong (1996) identify that the accuracy of the data in a document is primarily arrived at through the believability, objectivity, and reputation of the data provider. Relevancy of information is that which is "appropriate to answering the question at hand" (p. 18), which is influenced by such factors as how much the new piece

of information delivers to the user, the timeliness of the information, and the amount of coverage the information provides. With respect to timeliness, Wang and Strong assert that the more recent a piece of relevant information is the higher, the quality. The coverage, or depth, of data is task dependent, that is, it is related to the task that the user is attempting to complete. Some tasks require just a cursory amount of information in order to be completed. For example, looking up a definition of a word requires only that a satisfactory definition be provided. However, other tasks might require that the information provided be more in-depth. For example, if a user is seeking information on a health related issue, more in-depth information is often perceived as being provided the better.

In addition to accuracy, representation is also a component of information quality. According to Wang and Strong (1996) representation is a combination of interpretability of information, ease of understanding, representational consistency, and conciseness in representation. Interpretability is defined as the ability of the user to easily interpret the data in the context in which it is provided. For example, when looking at the price of an item, users expect the prices to be listed in the local currency. Representational consistency refers to the fact that the data is being presented in a consistent manner throughout the presentation, continuing the price example, the unit of currency does not change within a document. Concise representation refers to presenting information in such a way that there is very little information presented that is not relevant to the information seeking need. Wang and Strong's (1996) definition of representational quality is directly related to message quality as described by Rieh and Danielson (2006).

Information quality is influenced by many things, including the media in which the information is presented; applying the ideas of information quality to the Internet, one can examine the notion of website quality. Several researchers have examined how users assess the usability of information on websites in an information seeking task when attempting to provide a framework to evaluate website quality (Fritch & Cromwell, 2002; Reih, 2002).

In helping to understand website quality, Fritch and Cromwell (2001, 2002) used the concept of filters as a means of evaluating the different aspects of a website's content. Filters are the means by which a user evaluates the cognitive authority of information. They note, however, that the Internet, as a media choice, provides unique circumstances for this filter and therefore require its own set of filters: document filter, author filter, institution filter, and affiliation filter.

According to Fritch and Cromwell (2001), a user invokes document filters when he or she evaluates how current the information is and the accuracy of a website's content. Document filtering is greatly influenced by surface credibility, as described above in the source credibility (Wathen & Burkell, 2002). A user may also consider a "last updated" stamp, if there is one, denoting when the website's content was updated, to evaluate the timeliness, and consequently the accuracy. Users are particularly attuned to this in areas of science and current events where information frequently changes. With regards to a website's format, Reih (2002) extends this concept by examining how a website is presented; including such characteristics as the layout of the website and how easy it is to navigate the website, in addition presentation aspects such as font size, grammar, and spelling affect this evaluation. Is the website on one large webpage or

divided into several easy to navigate sections? The format of the website is directly tied to its surface credibility, if a user finds a website format difficult to use he or she may not use it regardless of how useful the information is.

Author filtering is concerned with how a user evaluates the website's author's credibility. While this is similar to Liu (2004), Fritch and Cromwell (2001) focus their model on websites and the unique aspects provided by Internet tools. For example, websites are able to use hyperlinks to connect to other pages to help establish author credibility. There are four factors that influence how a user evaluates an author's credibility: the identity of the author, the author's reputation, his or her asserted qualifications, and the ability to verify the author's credentials. Author filtering has a unique component in that it includes reputed credibility, but also includes presumed credibility (which is assigned by the user from factors which may not be connected to any established credentials). For example, professors may have a reputation as being unbiased and thus likely to be seen as providing balanced information. Reputed credibility can be gained by a website author providing his or her credentials as a professor.

Institutional filtering is concerned with how a user incorporates the information about the institution in order to evaluate the credibility of the information provided in a website (Fritch & Cromwell, 2001). Institution filtering is similar to author filtering containing identity of the institution, reputation of the institute, asserted qualification, and the ability to verify the identity and qualifications of a given institute. The internet allows users to find this information, provided by website designers or to find this information independently. Source rating refers to where the document initiates (Reih 2002), users

tend to assess different levels of credibility to various sources of information. For example, users may be less likely to trust a company's website with regards to pollution information than they would a government agency's website. When using the Internet, users can evaluate this by looking at the web address to determine the "type" of website, for example ".com" websites are usually authored by companies and ".gov" websites are typically authored by government agencies.

The last type of filtering that Fritch and Cromwell (2001) describe is affiliation filter. According the authors, affiliation filters demonstrate that the website's author is affiliated to other credible institutions or authors. For example, a research center may provide hyperlinks to funding agencies and various organizations that participate in the center's activities. Again, the Internet provides a unique platform to help website designers establish these connections. As can be seen in the above discussion information quality and website quality are very closely related. While not synonymous, the ideas are closely linked and when considering how users evaluate information, influence one another. Aspects of information quality are contained in the type of media in which the information is presented (Alexander & Tate, 1999; Brandt, 1996; Rieh & Belkin, 1998; Wang & Strong, 1996), similarly Fritch and Cromwell (2001, 2002) and Reih (2002) identify how the Internet provides unique opportunities to help establish website quality.

2.5 Credibility Frameworks

Several frameworks have been developed in order to study how people evaluate information and determine if it is credible (Reih 2002, Fogg 1999). Three frameworks have been incorporated to study the evaluation of information on the Internet; Cognitive

Authority, Elaboration Likelihood Model of Persuasion, and Prominence-Interpretation Theory. This next section will discuss each of these theories and demonstrate how they have been incorporated into website evaluation.

2.5.1 Cognitive Authority

Wilson (1983) developed the concept of Cognitive Authority in order to explain how individuals evaluate sources of information that they are unable to experience firsthand. According to Wilson, there are different types of authority: administrative authority, institutional authority, and cognitive authority. Administrative Authority is conferred by position or hierarchy. A police officer is an example of administrative authority. Institutional authority is authority that is derived from institutional affiliation. An example of institutional authority would be the authority given to a school principal in the area of curriculum development. One of the keys to Cognitive Authority is the concept of credibility. Wilson believes that there are two main components of credibility; competence and trustworthiness. It should be noted that Cognitive Authority can be conferred to either specific or general areas. An example of cognitive authority in a specific area would be the authority granted to a sports reporter, while a reader may be willing to accept the reporters analysis with regards to sports, he or she may not be willing to accept it in the area of politics. An example of general authority would be a newspaper in which a reader would grant it cognitive authority over a wide range of topics that the paper covers.

Several researchers have attempted to incorporate cognitive authority in order to provide a framework to evaluate website credibility. Fritch and Cromwell (2001) used the previously discussed concepts of filters in order to demonstrate how users establish

the cognitive authority of a given website. By using author and institutional filtering an individual is able to evaluate the competence of the individual or organization that is presenting the information.

Reih (2002) also demonstrates how the concept of Cognitive Authority can be incorporated into the evaluation of website creditability. Reih demonstrated how individuals use source ratings in order to establish the cognitive authority of a website. Reih showed that individuals are more likely to find information credible if it comes from a source that they believe is competent.

2.5.2 The Elaboration Likelihood Model of Persuasion

Petty and Cacioppo (1986) developed the Elaboration Likelihood Model (ELM) to demonstrate how people can have their attitudes changed through persuasive communication. According to the ELM there are two paths of persuasion, the central route and the peripheral route. The central route assumes that the individual that is seeking information will carefully deliberate all the facts that are presented and then make a decision (Petty and Cacioppo 1979). The peripheral route assumes that certain cues can be used in order to persuade an individual to alter their opinion without analyzing the context of the message (Petty and Cacioppo 1986).

Regardless of the persuasion path, the context of the message quality is important in order for the persuasion to be effective. There are two factors that determine the context of the message; argument quality and peripheral cues. Argument quality is defined as how credible the user perceives the message being delivered. Argument quality is mitigated by such factors as validity, novelty, and timeliness (Katz 1960). Peripheral cues include factors such as presentation and prestige of message deliverer. Several factors

influence which route if any will be effective in persuading an individual into accepting information, these include the following, personal relevance, bias, and issue-relevance.

Personal relevance is measured as how closely the information presented affects the individual Petty and Cacioppo (1986). For example, information about the performance of an automobile is likely to be of more relevance to a person seeking to buy a car than to someone who is not. The higher the personal relevance of an issue for an individual, the more difficult it is to persuade them to change his or her opinion. With respect to website design this means that sites that are concerned with important topics need to establish message credibility through the content and rely less on peripheral cues such as images and graphics. Eysenbach and Kohler (2002) demonstrate that content and source authority are important when an individual is seeking health information for himself or herself.

Petty and Cacioppo (1986) state that bias also affects how likely an individual is likely to be persuaded. When evaluating credibility people were more likely to view information that they agree with as more credible than information that they did not agree with. However, McInerney and Bird (2005), found that bias had little effect on website credibility with regards to sites that deal with genetically modified foods; suggesting that other factors may be involved.

Issue relevance is also affected by the route of a message (Petty and Cacioppo 1986). For example, if the message content is highly relevant to the issue in question, an individual is more likely to take the central routes, which will tend to focus on such issues as source authority and timeliness. Eysenbach and Kohler (2002) showed how websites concerning health issues tend to rely on experts and credible institutions in order

to effectively disseminate information. However, if the message content is not relevant to the issues, the message attempts to use the peripheral routes. Sites that engage in consumer product advertising tend to use peripheral cues such as celebrity endorsements and attractive graphics (Aladawani and Palvia 2002).

Several studies have incorporated the Elaboration Likelihood Model in order to study how effective websites have been in presenting their message. In addition, these studies attempt to determine what factors influence credibility. The ELM is heavily used in health communication, where the goal is to provide users with information that may alter their behavior and lead to better health practices (Hong 2006).

Hong (2006) hypothesized that a website was persuasive if an individual was likely to revisit it in the future. In order to test this she asked users to evaluate a series of health sites and state the likelihood they would return to these sites in the future. In addition, Hong asked what factors influenced this decision. Hong found two factors influenced the likelihood to return; trust/expertise and depth. Hong found that there were three factors that influenced trust; the material was presented by experts, the site is ethical, and the site seems to be from a leader in the field. All three of these factors are related to Wilson's concept of cognitive authority.

Hong (2006) also found that depth was determined by the following factors; level of comprehensiveness and broadness of information presented. Users were more likely to return to sites that they believed provided the broadest and most comprehensive information. It is interesting to note that individuals were able to find comprehensive sites, even though Bhavnani (2005) maintains that there are no health sites that contain all the information necessary to make informed decisions. This demonstrates the need to

have a variety level of websites in order to meet the information needs of a wide range of audiences.

2.5.3 Prominence-Interpretation Theory

Prominence-Interpretation theory was developed in order to expand how the Elaboration Likelihood Model is incorporated in an online environment (Fogg 2003). Specifically, Prominence-Interpretation allows for the measurement of credibility in an online environment. Fogg and Tseng (1999) define credibility as believability. Credible sources are those sources that people are likely to believe. Fogg and Tseng believe that credibility has two components; trustworthiness and expertise. Trustworthiness is defined as information that is well-intentioned, truthful and unbiased. Expertise is defined as coming from a source that is knowledgeable, experienced and competent.

Fogg (2003) believes that a website's credibility is demonstrated through the following constructs; prominence and interpretation. Prominence is defined as the likelihood that an element will be noticed or perceived. Interpretation is a person's judgment about the element under examination. An element's impact on the overall website credibility is a function of how likely a user is to see the element multiplied by the importance the user is likely to place on the element.

According to Fogg (2003) prominence is a combination of five factors: involvement, topic, task, experience, and individual differences. Involvement is defined as how closely a user is studying the details of the website. For example, if a user is just scanning a website he or she is likely to overlook a spelling or grammatical mistake, this mistake, then, is less likely to affect the website's credibility. The effects of hyperlinks are also influenced by their prominence. If a user is scanning a website and sees that there

is a hyperlink that provides more information he or she is more likely to view the content as credible; regardless of whether he or she clicks the link. Topic refers to the subject of the website. For example the website might be a medical site or a news site.

Task refers to the reason that the user is visiting the website. If a person is visiting just to browse or for entertainment he or she is less likely to notice individual elements on a website (Fogg 2003). However, the more in depth the task the more likely a user is to notice individual elements on a given website. If a person is shopping and the image of the product is different than what the text is describing he or she is less likely to view the website as credible and not likely to complete the transaction.

Experience also affects the prominence of individual elements on a website (Fogg 2003). Users who have a more in depth understanding of a given subject are more likely to notice a mistake. A medical expert is likely to be a better judge of the credibility of the information on a health website than a person who does not work in a medical field. This explains why novices are more likely to find a health site comprehensive than medical doctors Bhavnani (2005).

The last factor that affects prominence is individual differences amongst the users seeking information (Fogg 2003). For example, certain users tend to rely on visual cues in order to find information. This means that images would have a higher prominence than text in evaluating a website. In addition, different types of tasks require different types of cognitive styles (Saracevic and Kantor 1988). Thus factors that are more effective with one type of cognitive style may not be with others.

The user's interpretation of a given element on a website is a combination of three factors; the user's previously held assumptions, the skill/knowledge level of the user, and

the context (Fogg 2003). Assumptions are based on the user's previous experience with the element. For example, if a user had a bad previous experience with pop-up ads, he or she is more likely to view them negatively in the future. Skill and knowledge refer to both the user's experience in the subject area, as well as, his or her experience using the Internet. Finally, context refers to the setting in which the user is evaluating the website. If a user is in a hurry, a long load up time for a flash presentation may be annoying, however in a more relaxed environment the user may enjoy the interactivity that flash provides.

Fogg et al. (2003) attempted to validate the Prominence-Interpretation theory by asking a large sample of users to evaluate a large number of websites. Over 2,500 users were asked to evaluate over 100 websites. The websites covered a wide range of subjects such as news, health, financial, and general information. The research found that in order for an element to be credible it must also be prominent. For example, Lynch (2001) suggests that one way to ensure a website authenticity is the display a certificate of authenticity. However Fogg et al. (2003) found that few users mentioned that they noticed any certificates when evaluating a website. In fact, Fogg et al. found that the most cited reason for claiming that a website was credible was its look and feel. This seems to be supported by Robins and Holmes (2007) finding that sites with higher aesthetic values were viewed as more credible. A caveat should be mentioned however, the results were for a large number of sites across different subject areas; it may be that the design impact is greater in some areas than others. These findings tend support the Elaboration Likelihood Model, that without out a pressing concern users are likely to rely on peripheral cues in order to evaluate information.

Fogg et al. (2003) also suggest that great care be taken in determining which elements of a website should be highlighted. If a web designer chooses to highlight an inappropriate element it may diminish the overall credibility of the website. For example, if a website has too many images it may take too long to load and the user may lose interest.

2.6 Task

Several researchers have attempted to demonstrate how different types of tasks influence how individuals seek information. Marchionini (1989) proposed that there are two types of tasks when users seek information closed tasks and open tasks. Closed tasks are those types of tasks that have a definitive answer. An example of a closed task is finding the mailing address of a particular organization. Open tasks are those tasks that may have multiple answers to a particular question. Attempting to find the reviews of a particular restaurant would be an example of an open task. While Marchionini provides a useful departure point for incorporating task into credibility research there are some limitations to his approach. The first limitation is that the categories are too broad. For example the following are two types of closed tasks finding the address of a particular building and verifying the address of a particular building. In the first task the user is unaware of the correct answer and is more inclined to scrutinize the source of a potential answer. In the second task the individual believes that she knows the correct answer and is just looking for a source to reinforce his or her belief. Another short coming with Marchionini's approach is that it does not allow for the possibility that a task may be more than one dimensional.

Byström and Järvelin (1995) provide a framework for a more granular approach to classifying tasks. According to the authors there are five types of tasks: automatic information processing tasks, normal information processing tasks, normal decision tasks, known genuine tasks, and genuine decision tasks. Automatic information processing tasks are similar to Marchionini's (1989) closed task. According to Byström and Järvelin automatic information processing tasks are those tasks in which there are established procedures and expected results. Normal information-processing tasks are also fairly structured but require a small amount of user interpretation in order to be completed. Normal decision tasks are still structured but require greater input from the user in order to be completed. Known genuine decision tasks are those types of tasks in which the desired outcome is known but the process through which to determine the outcome is unknown. Finally genuine decision tasks are those tasks in which both the structure of the task, as well as, the outcome of the task are not known in advance.

While Byström and Järvelin (1995) helped further clarify the role of task in information seeking behavior, they did not address how users incorporate credibility when evaluating the information that users collect when attempting to complete a specific task. In addition, the researchers were interested in how users sought information in business context across several information source types. While these tasks may be applicable in certain business settings, they do not provide a useful guide to how users seek and evaluate information in a more informal environment.

Other researchers sought to determine how task complexity has influenced how users seek information. Kim and Allen (2002) demonstrated that the more specific the task, the less time it took individuals to complete the task and the fewer pages visited by

the users. Saracevic and Kantor (1988) classified tasks according to the following two criteria: broad and specific. Broad tasks were those tasks that required greater interpretation on behalf of the individual seeking the information. Specific tasks are similar in nature to Bystrom and Järvelin concept of normal information-processing tasks (Byström and Järvelin 1995). Neither of the studies mentioned above addressed how users incorporated credibility when attempting to complete an information seeking task.

2.6.1 Task Complexity and Task Difficulty

Task complexity has been shown to affect how people engage in information seeking behavior. Several researchers have attempted to provide a conceptual model of task complexity. According to Campbell (1988) task complexity can be treated as the following: a psychological experience, an interaction between task and personal characteristics, and as a function of objective task characteristics. According to Riding and Chema (1991) the cognitive style of the individual seeking information can be defined in to broad categories: the wholist-analytic style and the verbal imagery style. Wholist-analytic divides individuals into groups that process information either in whole or in parts. Verbal imagery refers whether individuals are inclined to represent information verbally or in images. Ford et al. (2001) found that verbally minded individuals tended to have a more difficult time navigating and completing tasks on the Internet.

Personal characteristics also affect task complexity. March and Simon (1958) define task complexity in terms of the abilities of the individual engaging in the task. Frost and Mahoney (1976) distinguish between tasks that are prescribed versus non-prescribed. Prescribed tasks are those tasks that have a known procedure in order to be

completed. In addition the individual is aware of how to complete the task. Non-prescribed tasks on the other hand are characterized by incomplete directions, as well as, several alternative outcomes. Jones and Tarr (2007) split tasks into two main categories: lower-level demand task and higher-level demand. Lower level demand tasks are those tasks that require individuals to resort rote procedures and memorization. In addition lower level tasks do not require the individual to have an understanding of the underlying concepts that are needed to complete a task. Higher level tasks require the individual to make connections between several abstract concepts in order to fulfill the task.

Personal task complexity is a highly subjective measure (Maynard and Hakel 1997). Subjective task complexity is defined as how difficult the individual perceives the task to be. Objective task complexity is measured by a predetermined set of criteria. Measures of objective task complexity include degree of background knowledge required to complete the task, number of steps required to complete the task, and number of possible task outcomes.

There are several external causes of task complexity. One cause is the presence of multiple paths to a given desired end state (Campbell 1988). Finding the time a given movie showing is an example where it is possible to use multiple paths to find the given information. The role of media credibility affects which choices of sources an individual chooses when attempting to complete a task (Savolainen 2007). In addition it is possible for individuals to use different procedures in order to complete a given task.

The possibility of multiple outcomes also increases the complexity of task (Locke et al. 1981). When the possible outcome of a task is unknown it requires that the individual engaging in the task compare and evaluate all the possible outcomes. In

addition, when the multiple outcomes are in contradiction to one another the individual has to evaluate and compare the contradictory information that they are being presented. Sonnenwald (2005) maintains that individuals create information horizons in which they will engage with multiple information sources when completing an information seeking task. It is possible that an individual does know what sources they may need in order to complete a given task. Not knowing all the possible choices of information sources that are available to an individual will lead to an increased level of task complexity (Campbell 1988).

2.7 Summary

The previous sections demonstrate that the evaluation of credibility of information is a multiple faceted endeavor. Prior to evaluating the credibility of the information presented to them, individuals need to determine if the information is relevant. There are many criteria that an individual uses when evaluating the relevance of the information that is being presented. These criteria include the content and source of the information presented, the level of interest of the individual in the topic being researched, and context in which the individual is seeking the information.

After the individual determines that the information found is relevant, he or she must make a determination of quality of the information that is being presented. Among the factors that individuals use to evaluate the quality of the information presented include accuracy, timeliness, and depth of coverage. In addition the information that is being presented must be of use to fulfilling the information need at hand.

In addition to determining the quality of the information that is being presented an individual also seeks to evaluate the credibility of the information of being presented.

When evaluating the credibility of given piece of information the individual focuses on the source of the information, as well as the message. Factors that individuals use to evaluate the source of information include the previous experience that the individual had with the source, the ability to validate the information that is being presented and lastly the reputation of the source. The criteria that individuals use to evaluate the message credibility of information include the presentation of the information, as well as the content of the message.

Several frameworks were introduced that have been used to determine how people arrive at credibility judgments. Cognitive authority assumes that individuals grant credibility to those sources that individual deem as being authoritative. The elaboration likelihood model posits that when determining the credibility of a given source the individual receives information from either the central or peripheral route. The central route is composed of the source of the information while the peripheral route refers to presentation. The relative importance of the topic to the individual determines which route they will focus on. The prominence interpretation theory incorporated the elaboration likelihood model to the Internet.

The task that the individual is engaged in also determines the criteria that the individual will use when determining the credibility of information that is being presented. Task complexity was introduced as a way to classify tasks. In addition the level of detail needed to complete an information need also affects task.

The next section will present a model that will incorporate all the presented information to demonstrate how individuals evaluate information presented to them as they engage in information seeking behavior on the Internet.

Chapter 3 Theoretical Propositions and Research Questions

3.1 Theoretical Background

As the literature review has demonstrated the construct of credibility is complex and is influenced by several factors. As figure 2 in chapter one demonstrates there are three main stages that an individual engages in when determining the credibility of an information object: assigning the information need, evaluating the information, and lastly determining the credibility of information presented.

There are two main factors that influence an individual when they are attempting to fulfill an information need: the nature of the task that they are attempting to fulfill and the level of personal relevance of the task. Xu (2007) has demonstrated how individuals use different criteria to evaluate the relevancy of information when engaging in non-problem solving information searches compared to problem solving searches. According to Xu novelty is more important in determining if an information object is relevant to an individual during a non-problem search than it is to an individual engaging in a problem seeking task. For example in addition to the type of information seeking task also affected how the individual evaluated the topicality of an information object. When engaging in a problem seeking task individuals used stricter criteria to determine topical relevance. While Xu's study provides an interesting analysis of how the type of information search affects an individual's relevance judgment of information it does not discuss what, if any, affects the nature of the task may have on an individual's credibility judgments.

Johnson and Kaye (2004) demonstrated that the level of interest in a topic influences how the individual determines creditability online. The authors found that

individuals that had a higher degree of interest in a topic tended to rely on the source of an information object when evaluating credibility. In addition, individuals tended to return to sites that they had previously found useful. However the authors were only concerned with political topics and as such it is difficult to determine if these results would be accurate across various topical domains.

The nature of task is also defined by its complexity. Byström (2002) demonstrated that the complexity of an information seeking task affected how individuals search for information. Specifically the more complex a task was the more sources that an individual would use in order to complete the task. Byström defined task complexity as the perceived difficulty that an individual would have while completing the task. Campbell (1988) argues that task complexity is defined as the number of inputs and possible outcomes that a given task may have. Tasks were considered to be more complex when either the required inputs to complete the task were unknown or when there were multiple possible outcomes. Byström's definition relies solely on the individual's perception of a problem to determine its complexity, making it difficult to determine task complexity across multiple individuals. Campbell's definition fails to take into account how individuals with different problem solving skills may view task complexity. When determining the complexity of a task it is important that both the perceived difficulty of the task by the individual, as well as, more objective measures be included.

The second stage of the process is evaluating the quality of the information that is presented. There are two criteria that individuals evaluate: the message contained in the information object, as well as, the source of the information object. Freeman and

Spyridakis (2003) studied how individuals evaluate the credibility of online health information. The authors found that users sought to determine the websites author's qualifications and affiliations when determining the credibility of the information presented. In addition, users sought to be able to easily verify the information presented on the website from external sources. This study, however, did not address how the previous experience that an individual had with the website affected how they would evaluate the credibility of information presented. Also, given that Freeman and Spyridakis evaluated only health sites it is difficult to determine if the findings of the study can be extended to other topic areas.

Rieh (2002) attempted to show that individuals use four main criteria when making judgments of the credibility of information presented on a website: the source of the website, the content of the website, the format in which the information is presented, and lastly the presentation of the material. While Rieh asked the users in her study to evaluate several websites across different topic domains, the tasks that the individuals engaged in were all open ended. As Kim (2008) demonstrated how different types of tasks alter how individuals engage in information seeking tasks.

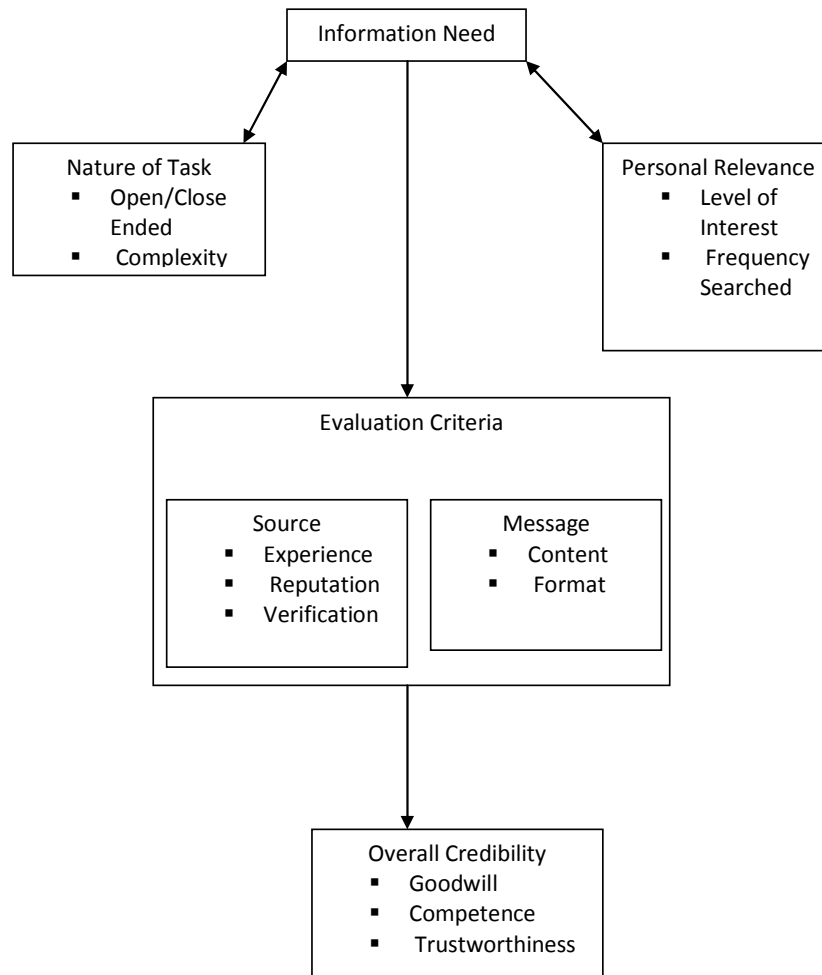
After evaluating the information presented an individual then determines the credibility of information that is presented on a website. McCroskey and Teven (1999) stated that credibility is composed of the following constructs: trustworthiness, competence and goodwill. The authors asked their subjects to evaluate several public and private individuals along these areas in order to determine if the individual thought that the person was credible. While the researchers were able to demonstrate that all three constructs helped to compose credibility the findings were limited in scope. The subjects

were not asked to evaluate if the credibility assigned by individuals would differ if the task and context in which the user engaged with them were altered. In addition this study also focused on interpersonal relationships, it is difficult to determine if these same constructs would be valid in an online environment.

3.2 Theoretical Model

The model below demonstrates how information seeking task and personal relevance influence an individual's credibility assessment when attempting to complete an information seeking need on the Internet. The upper rectangle in the model represents the information need that the individual is seeking to fulfill. The information need is composed of the task that needs to be completed, as well as, the level of personal interest that the individual has in completing the information need.

Figure 3.1 Theoretical Model



Under the information need the upper right rectangle refers to the task that the user is engaged in. There are two criteria that influence task: whether it is open or closed ended and the complexity. Open ended tasks are those tasks that the answers are subject to interpretation. An example of an open ended task would be searching for information on a specific company in order to determine if it is worth investing in. Closed ended task are those tasks that have a more definitive answer. Finding the mailing address of an

institution would be an example of a closed task. According to Kim and Allen (2002) open ended tasks would require cognitive effort to complete. Complex tasks are those tasks that require more time and multiple sources in order to complete. Marchionini (1989) states that these types of tasks are more open and may require the user to evaluate multiple sources of information. I propose that the more complex and open the task the user will focus on the source of the information.

The rectangle to the left refers to the personal relevance that the user places on the information seeking task. According to the Elaboration Likelihood Model (Petty and Cacioppo 1986) the more central the information need to the individual the more he or she is likely to focus on the source of the information when evaluating the credibility of the information presented. Conversely if the information seeking task is of peripheral interest to the user he or she is likely to focus on the presentation of the message when evaluating credibility.

The criteria that is used to by an individual to evaluate the credibility of a website is influenced by the level of involvement that the individual has with the given topic, as well as, the task the individual is attempting to complete. These evaluation criteria are represented by the large rectangle at the center of the model. The two main criteria are the source of the information, as well as, the message itself.

The source of the information is influenced by the following components: prior experience with the source, the reputation of the source, and the ability to verify the information presented by the source. If an individual has had a previously satisfactory experience with a website they are more likely to view the information presented in the website as credible in the future. Reputation refers to how credible a person thinks a piece

of information is based on the recommendation of a third party. Users are more likely to view as credible information that has been validated by a third party that they trust. This validation can be either explicit or implicit. Explicit validation occurs when the individual is familiar with the recommender. For example a friend that recommends a specific website. Implicit validation occurs when the individual is unfamiliar with the recommender but still values their input. An example of implicit validation may be a hyperlink to an unknown website from a trusted website. Verification refers to the ability independently validate the information presented on the website. Verification will allow users to reduce source ambiguity by being able to properly validate the information. If an individual is able to independently validate the information on a website, he or she is more likely to view that information as credible.

The message rectangle refers to the information that the website contains. There are two main components that users incorporate when evaluating the message presented on the website. Format refers to the way the information is presented. If the information is presented in a professional manner individuals are more likely to view the information as credible. The content of the message refers to the actual information presented. In order for individuals to view the content as credible it must be topical, timely and comprehensive.

The final rectangle refers to the overall credibility that users give to the information presented on the website and the components that make up credibility. The first component is competence. Competence is how authoritative the information presented the individual is viewed. This is related to the source credibility.

Trustworthiness refers to how honest the individual believes the website is. Goodwill

how the individual perceives the intent of the website with regards to their well being. Individuals are more likely to find information as credible if they believe that the presenter has their best interest in mind.

3.3 Research Questions and Hypotheses

In order to determine how task and personal relevance influence user's evaluation of credibility when searching for information on the Internet; I propose to answer the following research questions.

RQ1: How do users incorporate credibility when engaging in information seeking task on the Internet?

RQ2: What factors do users incorporate when evaluating the source credibility of an information object while engaging in an information seeking tasks on the Internet?

RQ3: What factors do users incorporate when evaluating the message credibility of an information object while engaging in an information seeking tasks on the Internet?

RQ4: How does the complexity of a task relate to the perceived credibility of information gathered during an information seeking task on the Internet?

H1: The more complex a task the greater the emphasis a user will place on the source of a website when evaluating the information that is presented.

RQ5: How does personal relevance influence credibility with respect to an information seeking task on the Internet?

H2: The higher the personal relevance of a topic the more emphasis that user will place on the source of the information that is being provided.

Table 3.1 illustrates how the variables in the theoretical model are related to the research questions and hypotheses.

Table 3.1 Variables Used in Theoretical Model

Concept	Variable	Use in Previous Studies	Expected Results
Source Credibility			
	Experience	(Wathen and Burkell 2002), (Pavlou and Gefen 2004), (Hong 2006), (McKnight, Choundry and Kacmar 2002)	As an information need takes on a higher degree of personal relevance, users will place a higher importance on previous experience with the source when evaluating the credibility of a website. With regards to task complexity, the less complex a task, the more important previous experience is in determining the credibility of a website.
	Reputation	(Pavlou and Gefen 2004), (Fritch and Cromwell 2001), (Freeman and Spyridakis 2003)	The more personally relevant an information need, the more important the reputation of the sources becomes when evaluating the credibility of the information presented. With regards to task, the more complex the task the more important the reputation of the source when evaluating the credibility of the information presented.

Concept	Variable	Use in Previous Studies	Expected Results
	Verification	Burbules 2001, (Abels, White and Hahn 1997), (Aladwani and Palvia 2002), (Tombros, Ruthven and Jose 2005)	The more personally relevant an information need the more important the ability to verify the information presented is to an individual when evaluating the credibility of the information presented. With regards to task, the more complex a task the more important the ability to evaluate the information presented is to an individual.
Message Credibility	Format	(Wathen and Burkell 2002), (Fritch and Cromwell 2001), (Robins and Holmes 2007), (Fogg et al. 2003), (Doll and Torkzadeh 1988), Kensicki 2003, (Rieh and Belkin 200), (Abels, White and Hahn 1997), (McKinney, Yoon and Zahedi 2002), (Tombros, Ruthven and Jose 2005)	For information needs that are of lesser personal relevance, the format of a webpage will matter more when evaluating the credibility of a website. With regards to task complexity, the less complex a task the more likely a user is to focus on the format of the webpage when evaluating its credibility.

Concept	Variable	Use in Previous Studies	Expected Results
	Content	(Wathen and Burkell 2002), (Hong 2006), Klobas 1994, Dutta-Bergman 2004, Bhavnani 2004, (Doll and Torkzadeh 1988), (Rieh and Belkin 200), (Abels, White and Hahn 1997), (McKinney, Yoon and Zahedi 2002), (Hartson, Andre and Williges 2003), Danielson 2006, (Aladwani and Palvia 2002)	The more personally relevant the information need, the more the user will evaluate the content of a message in order to evaluate its credibility. With regard to task complexity, the more complex the task the greater the importance placed on the content when evaluating the credibility of the information presented.
Task	Open/Closedness	Marchionini 1989, (Saracevic and Kantor 1988), (Kim and Allen 2002), Bystrom 2002, Rieh 2004, (Tombros, Ruthven and Jose 2005), (Bystrom and Järvelin 1994)	In closed tasks the individual is likely to focus on format and presentation of an information object when evaluating its credibility.
	Difficulty	(Byström and Järvelin 1994), (Maynard and Hakel 1997)	The more difficult the task is perceived by the user the more the individual will focus on the source of the information object when evaluating its credibility.
Personal Relevance		(Petty and Cacioppo 1986), (Johnson and Kaye 2000)	The more relevant a topic to an individual, the more often they are likely to engage in an information seeking task on the topic. In addition the individual will think that the topic is of greater importance the more personally relevant the topic is.

Chapter 4 Research Methods

This study examines how the level of personal relevance and task complexity affect a subject's credibility judgment while searching for information on the Internet. In order to accomplish this, subjects were asked to complete four information seeking tasks. Two of these tasks came from a selected area (technology, fitness, environmental and financial) that the subject had expressed an interest in; the other two came from an area in which the individual expressed a low level of interest in. Within each topic area, the two tasks differed in their level of complexity. After completing each task, subjects were asked a series of questions to evaluate the credibility of a randomly selected website he or she used to complete the task. The remainder of this chapter details the methods and analysis used to complete this study.

4.1 Overview of Methodology

This study was conducted in a modified natural setting. Tague-Sutcliffe (1992) suggests that in a laboratory setting, the researcher is able to control the possible sources variability that may arise from sources such as users, search constraints, and databases; natural settings provide for a more realistic assessment of how subjects interact with information retrieval systems. The natural setting used here was modified in such a way so as to control for extraneous variation. Some constraints such as the tasks completed, time allocated, and equipment were identical across all subjects. Other factors such as websites visited and search engines used vary according to the subject's preference, allowing subjects to search in a setting natural, or familiar, to him or her.

Research indicates that the level of control a researcher wants to maintain in an experiment varies with the specific research questions that he or she is attempting to

answer (Tague-Sutcliffe, 1992). Robertson (1981) explains that in order to answer a specific question the research must be designed as a laboratory test to exclude any extraneous variations. On the other hand, in order to answer a question that is directly related to real problems in the design of retrieval systems, tests must be conducted natural settings; Schamber (1994) noted that researchers were placing greater emphasis on natural settings while engaging in relevance based evaluation. Additionally, Park (1993) emphasized that the “naturalistic inquiry approach” is best suited when attempting to understand how users make selection decisions in accepting or rejecting information produced by information retrieval systems. By having the subjects engage in simulated tasks on identical equipment, this study will be better able to determine how subjects determine credibility on the Internet by keeping environmental variables constant. However, the modified natural setting will allow subjects to conduct the searches in an environment that they are accustomed to.

4.1.2 Task and Task Scenario

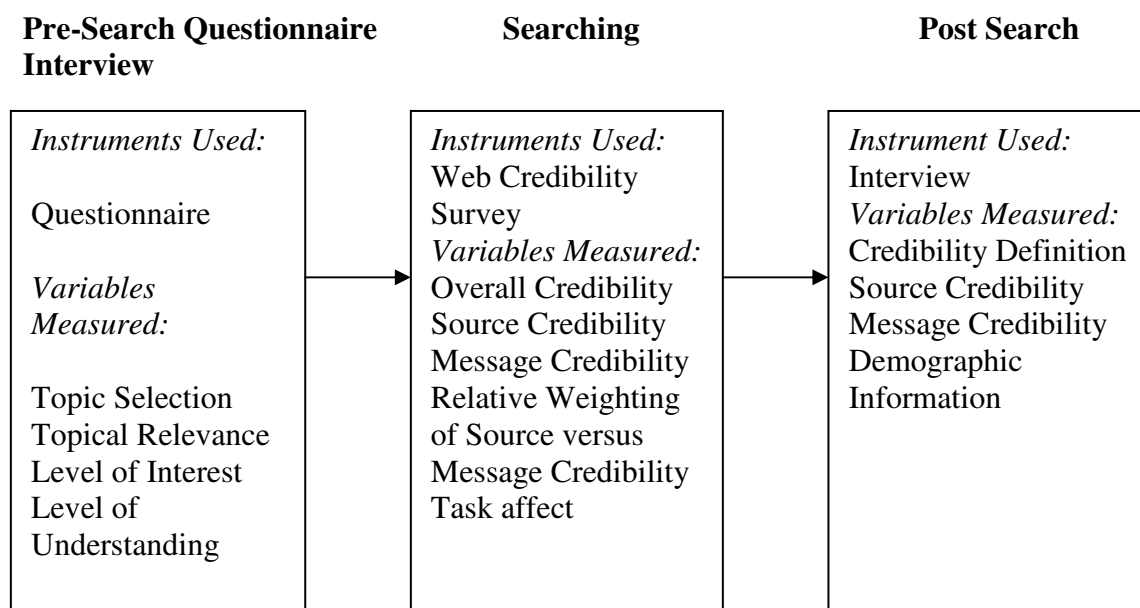
For this study, tasks were simulated scenarios that mimic real world situations subjects might face while attempting to complete an information seeking need on the Internet. This study used tasks from several topic areas and different levels of complexity in order to determine how the task influences a subject’s credibility judgment of information that is presented on the Internet. Borlund and Ingwersen (1997) explain how this approach allows subjects to make personal assessments on what constitutes credible material, while allowing the researcher to systemically investigate how subjects behave in order to solve tasks. Task scenario requires a pre-assessment of background knowledge of the subjects. In this study each subject will be asked to evaluate his or her

understanding of the four topic areas prior to completing the information seeking tasks. The content of the task scenarios will be chosen in order to provide reasonable approximations of normal information seeking tasks on the Internet.

4.2 Procedures

This study is composed of three main components. The first component was a Pre-Search questionnaire in which the subject was asked to rank the following four areas by level of interest: finance, fitness, the environment, and technology. These areas were chosen because they provide a broad range of topics that individuals are likely to encounter when attempting to find information on the Internet. Subjects were asked to answer how often they search the Internet for the topic they expressed most interest and least interest. Subjects were also asked to how they rate their level of knowledge in the two topic areas. The Pre-Search questionnaire measured the level of personal relevance the individual places on the topics in the study. This was necessary to later connect how the level of personal relevance that the subject attaches to a topic affects how she or he evaluates the credibility of information while attempting to complete an information seeking task in that area. Figure 4.1 illustrates the three stages and the variables measured in each stage. Appendix A.1 contains the Pre-Search questionnaire.

Figure 4.1: Experimental Flow Chart



After the antipodal topic areas were selected the subjects completed two search tasks in each of the areas. The two types of search tasks are: background and fact retrieval. Background tasks occur when users seek a general overview of a topic. Advice/opinion tasks are those tasks in which a subject seeks input from an authoritative source for decision making purposes. Fact retrieval includes those tasks in which a subject is seeking a specific piece of information that is both well defined and indisputable as it was presented to them. Table 4.1 shows the eight different tasks used in this study.

Table 4.1 Experimental Tasks

	Background	Fact Retrieval
Environment	You are interested in learning more about possible alternative energy policies that are available to the United States in order to increase energy independence.	Please determine which country the United States imports most of its oil from.
Finance	You have just read an interesting article on Allegheny Energy and are interested in investing in the company. Find websites that you think will provide you with an overview of the company's projects and history.	What were Allegheny Energy's revenues for 2008?
Fitness	You are interested in training to run a marathon and would like to learn about the training required in order to complete a marathon.	Please find out where the finish line for the New York City Marathon is located.
Technology	You are interested in purchasing a computer and would like to learn more about the features you should focus on in order to get a computer that most fits your needs.	Define what a CPU is with regards to a computer.

The individuals were given ten minutes in order to complete each task; if after ten minutes the subject was still working on the task they were asked to stop. The tasks were completed on the same laptop with a wireless connection to the Internet; this allowed the study to be done in a variety of settings which could be considered natural to the subject (coffee shops, houses, libraries, etc.). While completing each task a proxy server was used track of the websites visited completing each task. After the subject had completed

the task, a Python® script randomly selected one of the websites and the subject completed a survey rating the credibility of the information presented on the website. Appendix A.2 contains the Python® script that was used. The subjects completed the fact retrieval task first, followed by the background task. The order of tasks was chosen by perceived order of complexity (Kim and Allen 2002). While a Latin Square design may have assured that any possible order effect would be minimized, there was a chance that while completing the background task the subject would find the information necessary to complete the fact retrieval task, therefore the fact retrieval task was always completed first. The order of topics was alternated so that half the subjects completed the high topical relevant searches first while the other half will complete the lower topical relevant searches first. After completing all search tasks the subjects will be interviewed to explain what credibility means. Appendixes A.3 and A.4 contain copies of the survey and questionnaire used.

4.3 Instruments

Search sessions were conducted on wireless laptop computer at various WI-FI locations. The default browser used was Firefox® with the initial screen set to the Rutgers University School of Communication and Information homepage (<http://comminfo.rutgers.edu/>). By using a specific web browser for all subjects it is possible to minimize the effects of browser issues may have on the subjects' credibility judgments. Using same homepage allowed the subjects to select any search engine, if any, to complete their searches. Allowing users to select their own search engines reduces the potential of search engine bias (Thelwall 2000). Noninvasive tracking software

captured the websites visited, as well as the time spent on each page. This information provides data about the subject's perceived complexity of the task.

4.4 Variables

4.4.1 Personal Relevance

Personal relevance measures how important the topic of the task that is being completed is to the subject. For this study, personal relevance was composed of the level of interest and frequency of searching. Level of interest is defined as the level of enthusiasm that the subject has toward the topic. Frequency of searching is how often the subject searches for the topic on the internet.

4.4.2 Task

Two different types of tasks were used in this study: fact retrieval and background. These tasks differ in terms of their form, the amount of data needed to complete the task, types of information needed, and the specificity of the answers and questions needed (Kim 2009). These differences are illustrated in table 4.2.

Table 4.2 Types of task and task attributes

	Fact Retrieval	Background
Form	Closed	Open
Type of information needed	Name of entity or short phrase	A paragraph or passage
Number of needed information objects	One	More than one
Question & Answer	Specific Question Specific Answer	General Question General Answer

Because the tasks differ in the nature of the information needed and the type of answer required, it is hypothesized that this leads to different types of credibility judgments by the subjects when evaluating the information that they are presented with.

Fact Retrieval

Fact retrieval includes those tasks in with a specific piece of information that is both well defined and indisputable. The expected outcome of the task is short phrases or the name of a specific entity. The answer to the task is usually recognizable to the subject when he or she finds it.

Background task

Background tasks seek a general overview of a given topic. It may be possible that there is more than one answer to the question being asked. Background tasks likely require the subject to compare the credibility of several sources of information some of which may be contradictory.

4.4.3 Credibility

For the purpose of this study overall credibility was defined as how credible the subject judged the information presented. As mentioned previously in order to evaluate overall credibility the individual evaluates the source of the information and how it is being presented (Danielson 2006). Overall credibility is composed of the following: goodwill, competence, and trustworthiness. Goodwill is defined as the subject believing that the website creator has his or her best interest in mind. Competence is defined as the individual believing that the person or organization presenting the website is authoritative in the subject area of the task. Lastly trustworthiness is defined as the level of credence that the subject places in the website's author.

In order to evaluate the overall credibility of a website, subjects were asked to evaluate the source of the website and its presentation. In addition, the subjects were asked to rate the relative importance of these two factors when determining the overall credibility of the website. Source credibility measured the credence that the subject places on the website's author. Source credibility included the following factors: experience, reputation, and verification. Experience described the level of satisfaction that the subject had with the website in previous searches. Reputation was how the subject regarded the website based on accounts presented to them through third parties. Verification referred to how easily the subject was able to independently validate the information presented in the website.

Message credibility measured the credence that the subject places on the content and presentation of the information that is on the website. Message credibility was composed of the content of the information, as well as, the format. Content was the depth and relevance of the information presented on the website, format is how the subject rated the presentation of the website.

4.5 Measures

Several instruments and approaches were used to measure the variables previously mentioned. These instruments included a Likert scale. Confirmatory factor analysis will be conducted on all the multi-item scales to ensure that they met the criteria of face validity and internal consistency. After confirming the uni-dimensionality of the scales, composite scores will be created by averaging the responses to individual items.

The survey instrument attempted to determine the role of authority, content, and presentation of a website when establishing the overall credibility of the information that

was being presented, including the following questions: What factors did subjects take into account when selecting a website he or she considered useful in completing the information task? How did the source and message influence the credibility of the website? How did subjects evaluate the overall credibility of the website?

Subjects completed an eleven point Likert scale. Eleven points was chosen since Weng (2004) has shown that a using larger number of response categories leads to a higher level of reliability. The categories were individually labeled to increase reliability.

In addition to the web credibility survey, the subjects completed a pre-search questionnaire and participated in a post search interview. The pre-search questionnaire allowed the subjects to rank the four topic areas by order of interest. The post-search interview allowed subjects to elaborate on how they evaluate credibility on the Internet.

4.5.1 Overall Credibility

Overall credibility is operationalized as being composed of competence, trustworthiness and goodwill. Items 18-20 on the web credibility survey were used to determine the level of competence the subject assigned to the presenter of the information. Item 18 asks the subject to directly rate the degree of competence that he or she assigns to the presenter of the information. Items 19 and 20 indirectly assess how the subject views the competence of the source of the information by looking at components of competence: authoritativeness and knowledge (Fogg 2003, Fogg and Tseng 1999). Table 4.3 contains the survey items that were used to measure overall credibility.

Goodwill was measured with items 21 through 23. Item 21 asked the subject to directly rate the degree to which he or she believed the website had his or her best interest in mind. Items 22 and 23 indirectly assessed how the subject viewed the goodwill of the

website's author by determining the degree to which the website creators were sensitive to the needs of its users (McCroskey and Teven 1999).

Trustworthiness was measured with items 24 and 25 of the survey.

Trustworthiness refers to how honest the subject believes the presenter of the information is (Fogg 2003). Item 27 asked the subjects to evaluate how balanced the information presented appears. Fogg and Tseng (1999) indentify that subjects are likely to view information as trustworthy if they believe that the information that is being presented is balanced.

Table 4.3 Overall Credibility Questions

Construct	Question	Type	Item Number
Credibility (Competence)	This site seems competent	Direct	18
	This site seems to be well informed	Indirect	19
	This site seems to be written by experts in the field	Indirect	20
Credibility (Goodwill)	This site seems to have my best interest in mind	Direct	21
	This site seems to be concerned with its users	Indirect	22
	This site seems to be sensitive to the needs of its users	Indirect	23
Credibility (Trustworthiness)	This site seems to be honest	Direct	24
	This site seems to provide balanced information	Indirect	25
Credibility (Overall)	Overall I found this website to be credible	Direct	30

4.5.2 Source Credibility

Source credibility referred to how credible the subject viewed the source of the information presented. Source credibility is composed of the previous experience that the subject had with the source, the reputation of the source, and the ability to independently verify the information presented. Item 28 will ask the subject to rate the overall source credibility of the website being presented. The degree that previous experience with an information source effects an individual's evaluation of source credibility will be measured in both the pre-search questionnaire and the web survey. Question 3 of the pre-search questionnaire and item 2 of the survey directly asked subjects to address the degree to which having previous experience with a website is important, in general, when evaluating the credibility of the source. Item 3 indirectly addressed experience by asking the subject whether he or she will use the website in the future in order to fulfill an information need (Wathen and Burkell 2002). Table 4.4 contains the pre-search questionnaire and survey items that were used to measure source credibility.

Reputation was measured with items 4 through 6. Item 4 asked the subject to rate the reputation of the website's creator. Item 5 indirectly rated the reputation of the website by asking the subject the likelihood that he or she would recommend the site to his or her friends (Freeman and Spyridakis 2003). Item 6 indirectly rated reputation by asking the subject if he or she found it important that the website presented its credentials (Fritch and Cromwell 2001).

Verification was measured with both the pre-search questionnaire and the survey. Item 7 directly asked the subject to assess how easily he or she was able verify the information that was presented. In the pre-search questionnaire individuals were asked

how important it is for him or her to be able to independently validate the information that was presented.

After each task the subjects were asked to rate by order of importance how experience, reputation, and verification influenced his or her in assignment the overall level of credibility.

Table 4.4 Source Credibility Questions

Construct	Question	Type	Item Number
Source Credibility (Experience)	Having previously used a website is important to me when evaluating the credibility of the information presented in a website	Direct	Pre-Search 3
	I have previously found this site useful when completing an information seeking task	Direct	2
	I plan to use this site in the future to complete an information seeking task	Direct	3
Source Credibility (Reputation)	The information was presented by an individual or organization that I hold in high esteem	Direct	4
	I would recommend this site to my friends	Indirect	5
	This website presented credentials that I found valuable	Indirect	6
Source Credibility (Verification)	I was able to easily verify the information that was presented on this website	Direct	7
	It is important for me to independently validate information that is presented to me	Direct	Pre-Search 1
	It is important to me that this website is able to provide supporting evidence to the information presented on its site	Direct	Pre-Search 2
Source Credibility (Overall)	Overall I found the source of the information presented on this website as credible		28

4.5.3 Message Credibility

Message credibility was operationalized as how credible the subject viewed the message that is being presented on the website. Message credibility is composed of the presentation of the information on the website and its content. Item 29 asked the subject to rate the overall credibility of the message being presented on the website. Items 8 to 11 of the survey measured how the subject rated the presentation and format of the website. Items 8 and 9 asked the subject to rate how easily he or she was able to read the information that is being presented (Robins and Holmes 2007). Item on the survey 11 asked the subject how easily the subject he or she was able to find the information that he or she was looking for (Wathen and Burkell 2002). In the pre-search questionnaire the subjects were asked how important, in general, it was for him or her to have a search function on a website. Table 4.5 contains the survey and pre-search questionnaire items that will be used to measure message credibility.

Content was operationalized as the depth and relevance of the information that is presented on the website Bhavnani (2005). Content was measured with items 12 thru 17. Items 12 and 13 asked the subject to assess if the information presented on the website is topical to the information need that he or she is attempting to complete (Dutta-Bergman 2004). Items 14 and 15 asked the subject if he or she found the information presented as being current (Hong 2006). Item 16 asked the subject to assess if the content provided by the website was able to fulfill his or hers information need (Bhavnani 2005). Item 17 asked the subject if the content presented on the website was accurate.

After each task the subject will be asked to rate the importance of content versus the presentation of information when evaluating the message credibility of the information that is being presented.

Table 4.5 Message Credibility Questions

Construct	Question	Item Number
Message Credibility (Format)	The site is formatted in a way that was easy to read	8
	The site has a professional look and feel	9
	The information in the site is presented in a way that makes it easy to navigate between sections	10
	Having a search function that makes it easy for me to find information on a website is important to me	Pre-Search 4
Message Credibility (Content)	The information presented is relevant to my information need	12
	The information presented is topical to my information need	13
	The information presented is current	14
	I was able to easily find when the last time the site was updated	15
	The coverage of the information on the website fulfilled my information need	16
	The information provided seems to be accurate	17
Message Credibility (Overall)	Overall I found the message presented on this website as credible	29

4.5.4 Task Complexity

Task complexity was operationalized as the degree of difficulty that the subjects had in completing the task. Item 28 on the web survey will ask the subject to evaluate how difficult of a time he or she had in completing the task by answering the following question: I had a hard time finding the information necessary to complete this task. In

in addition two measures were used to measure task complexity. The first indirect measure of task complexity was the average time that the subject spent on a webpage while completing the task (Saracevic and Kantor 1988). The second measure of task complexity was the number of pages that the subject visited while completing the task (Kim and Allen 2002). Both of these measures will be gathered by evaluating the search logs for each task.

4.5.5 Personal Relevance

Personal relevance was operationalized as the level of interest that the subject has on the topic. Item 29 on the web survey will ask the subject to rate how important the topic is to the subject. In addition there were three indirect measures of personal relevance by answering the following question: I find this topic important to me. During the pre-search interview, the subject will be asked to rate the four topic areas by level of interest. In addition the subject was asked how often they search for information on the Internet on the topic he or she is most interested and least interested in. The subject was also asked when was the last time that he or she searched on the Internet for both the topic that he or she is most interested in, as well as, least interested in. Finally the subject was asked how knowledgeable he or she is on the topic that they are most interested in and least interested in.

4.6 Sample

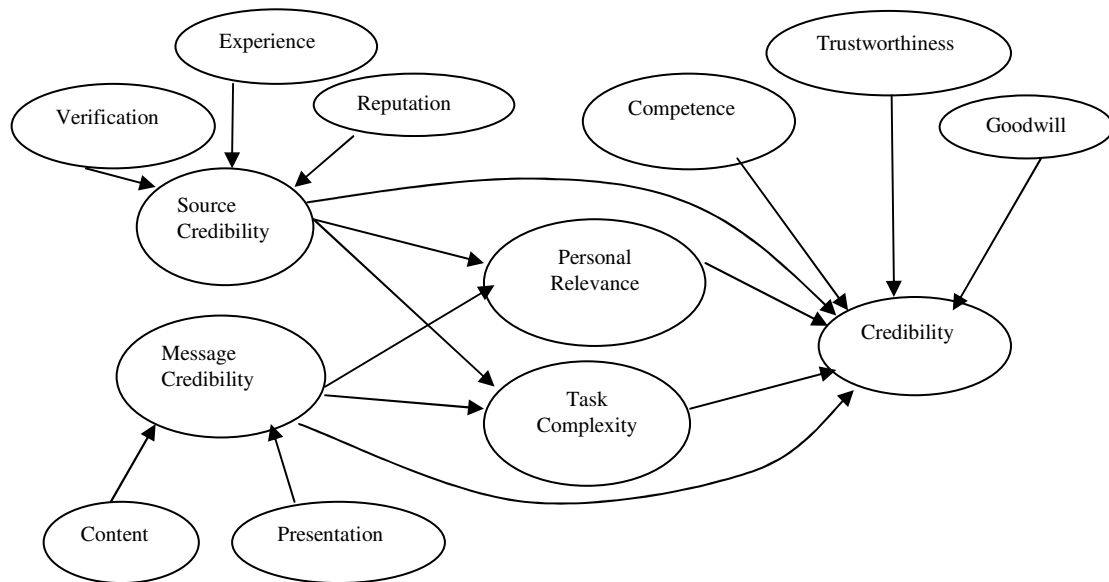
The sample included a group of 40 adults that will be recruited from Rutgers University. In order to recruit the subjects, an email will be sent to the Masters and Ph. D students' email mailing list. In addition flyers will be posted in the School of Communication and Information building requesting volunteers for the study. Appendix

B.1 contains a copy of the email and poster that will be used in order to recruit the subjects. Prior to starting the study the subjects were asked to give their consent to participate in the study. Appendix B.2 contains a copy of the informed consent form. While this sample is a convenience sample, given the diversity of the individuals participating in programs at the Rutgers University the results may be applicable to the general population. The unit of analysis for this study is the individual task. By having each user finish four tasks there are total of 160 data points.

4.7 Regression Model

Below is a diagram of the regression model that will be used in order to test the theoretical model presented previously.

Figure 4.2: Regression Model



As can be seen in the oval on the top left the source credibility is associated with the ability to verify the information that is being presented on the website. The subject's prior experience with the website also influences the how the individual rates the sources credibility. Lastly reputation also is associated with a subject's perceived credibility of a source.

The oval on the lower left refers to perceived credibility that the individual gives to the message that is being presented on the website. The message credibility is associated with the content that is being presented and how it is being presented as well.

Both source credibility and message credibility are associated with overall credibility, represented by the oval on the far right. Credibility is also associated with the

competence that the subject places in the information that is being presented.

Trustworthiness and goodwill are also associated with credibility.

Personal relevance is also associated with both source and message credibility. As mentioned previously, subject is more likely to rely on the source of information when the information need that an individual need is attempting to fulfill is of higher relevance to the subject. The level of personal relevance will also influence the perceived overall credibility of the information being presented.

Task complexity is also associated with both message and source credibility. When a subject engages in a task that is of a lower degree of complexity he or she is more likely to rely on the message being presented then on the source of the information. In addition task complexity is also associated with the overall credibility.

4.8 Approaches to Data Analysis

For the analysis data was gathered from the following sources: the pre-search questionnaire, the web credibility survey, search logs, and the post search interview. All data derived from the sources was entered into an SPSS ® file for further data analysis. In addition the results of the post search interview will be transcribed into Microsoft Word files.

The analysis of the data was multifaceted. The first stage of the analysis was to run a confirmatory factor analysis to ensure that the proper factors are loading on the correct variables. Cronbach's alpha will be used in order to ensure that there is significant degree of agreement between the various items used to measure a given variable. If the factor scores fail to load the following steps will be taken. First analysis was done to see if the variable loaded more closely on another factor it will be reassigned. In addition if

the variable did not load on any factor it was either eliminated or if it correlated with other variables that do not load on any factor a new group will be created.

After the confirmatory factor analysis was completed the following statistical methods will be used to analyze the data: linear regression, multiple regression analysis, and logistic regression. Linear regression analysis will allowed for the determination the effects of source and message credibility on overall credibility. The individual variable scores for each factor was averaged into a composite variable. These composite variables were then combined into a regression model. The following regressions were run: for source credibility the dependent variable will be the overall credibility that the subject assigns to the source of the information presented. The dependent variables was how the subjects rate the importance of having previously interacted with the website, the reputation that the subjects assigned to the author of the website, and the ability to be able to independently validate the information presented on the website. Message credibility was determined by how credible the subjects view the message presented on the website. The independent variables were how the subjects view the presentation of the information and the content of the message. In addition, by using the general linear model it was possible to determine any possible interaction effects between task and personal relevance with both source and message credibility. Multiple regression analysis allowed for the analysis of the effects of both source and message credibility on overall credibility while keeping both task and personal relevance constant.

Logistical regression allowed for the determination of the effect size of both source and message credibility in determining the overall credibility of a website. In addition logistical regression allowed for the accounting of how both personal relevance

and task complexity affect that relative weighting of source versus message credibility during different scenarios.

The first research question: How do users incorporate credibility when engaging in information seeking task on the Internet, was addressed using linear regression. The dependent variable will be overall credibility and will be gathered from item 32 on the web credibility survey.

With respect to the second research question: What factors do users incorporate when evaluating the source credibility of an information object while engaging in an information seeking tasks on the Internet? Source credibility was determined by item 30 on the web credibility survey.

For the third research question: What factors do users incorporate when evaluating the message credibility of an information object while engaging in an information seeking tasks on the Internet? Message credibility was determined by item 31. In addition multiple regression analysis will be run in order to determine if there are any interaction effects with source and message credibility and both task complexity and personal relevance.

Task complexity will be determined by item 28 in the web credibility survey. Item 29 will be used to determine the level of personal relevance. Lastly the regression model introduced in the previous section will used to determine the possible association between source and message credibility and overall credibility.

The results of statistical analysis were compared with the data gathered from the post search interview. The post search interview asked subjects to elaborate the factors that they use when attempting to evaluate both the source and message credibility of a

website and how these factors affect overall credibility. By using qualitative as well as quantitative methods to determine what factors determine credibility the study was able to establish a higher degree of validity.

The fourth research question: How does the complexity of a task relate to the perceived credibility of information gathered during an information seeking task on the Internet was addressed by using logistic regression and chi squared analysis. Logistic regression was conducted between task complexity and the relative importance of source and message credibility when determining the overall credibility and the task being completed. The relative rankings of source and message credibility were gathered from the web credibility survey. The first hypothesis: The more complex a task the greater the emphasis a user will place on the source of a website when evaluating the information that is presented will be tested using chi squared analysis to determine if there is a relationship between the relative rankings between source and message credibility and the type of task being completed.

The fifth research question: How does personal relevance influence credibility with respect to an information seeking task on the Internet will also be addressed using chi squared analysis. The level of personal relevance of a topic will be determined during the pre-search interview. The second hypothesis: The higher the personal relevance of a topic the more emphasis that user will place on the source of the information that is being provided will be tested using chi square analysis to determine if there is a relationship between the level of personal relevance and the relative importance of source and message credibility.

Chapter 5 Results

This chapter discusses the results of how individuals arrive at credibility judgments while evaluating the information that they are presented with while engaging in information seeking on the Internet. This chapter is divided into the following sections: subjects' profile and topic selection information, qualitative analysis of the model presented previously in section 5.2, construct validation, statistical validation of the model. Section 5.3 discusses how source credibility is evaluated. Section 5.4 discusses how message credibility is evaluated. Section 5.5 discusses the factor analysis that was run on the data. Section 5.6 discusses how personal relevance and task complexity affect these factors.

5.1 Subjects' Profile and Topic Selection

Forty volunteers were recruited to participate in the study. The subjects were recruited through a variety of means including the use of email, posting of recruitment posters, and word of mouth. The subjects included both students in School of Communication and Information at Rutgers University and volunteers from outside the University.

Subjects were characterized by age, gender, and ethnic background. Of the forty participants 27 were female (68%) and 13 were male (32%). The oldest participant was 56 while the youngest was 19. The mean age was 34.75 (SD = 10.86). The subjects were asked to self identify their ethnicity; 28 self identified themselves as White (70%), five as African-American (12.5%), six as Asian (15%) and one as Hispanic (2.5%).

As mentioned previously the subjects were asked to select from the following: the environment, finance, fitness, and technology the area in which they are most and least

interested in. For the topic of most interest fifteen users selected technology (37.5%), fitness and the environment were selected by nine (22.5%) and seven selected finance (17.5%). For the topic of least interest eighteen (45%) users selected finance, nine (22.5%) selected the environment, seven (17.5%) selected fitness, and six (15%) selected technology. Table 5.1 provides a breakdown of the selection of topics by users.

Table 5.1 User Topic Selection

Topic Area	High Relevance	Low Relevance
Finance	7	18
Fitness	9	7
Environment	9	9
Technology	15	6

With respect to gender, 10 (37%) women selected technology, 6 (22.2%) selected the environment or fitness, and five (18.5%) selected finance as the topic of high relevance. For the topic of low relevance; 14 (51.9%) selected finance, six (22.2%) selected the environment, four (14.8%) selected fitness and 3 (11.1%) selected technology. Figures 5.1 and 5.2 provide a breakdown of topic selection by gender.

Figure 5.1 High Relevance Topic Selections by Gender

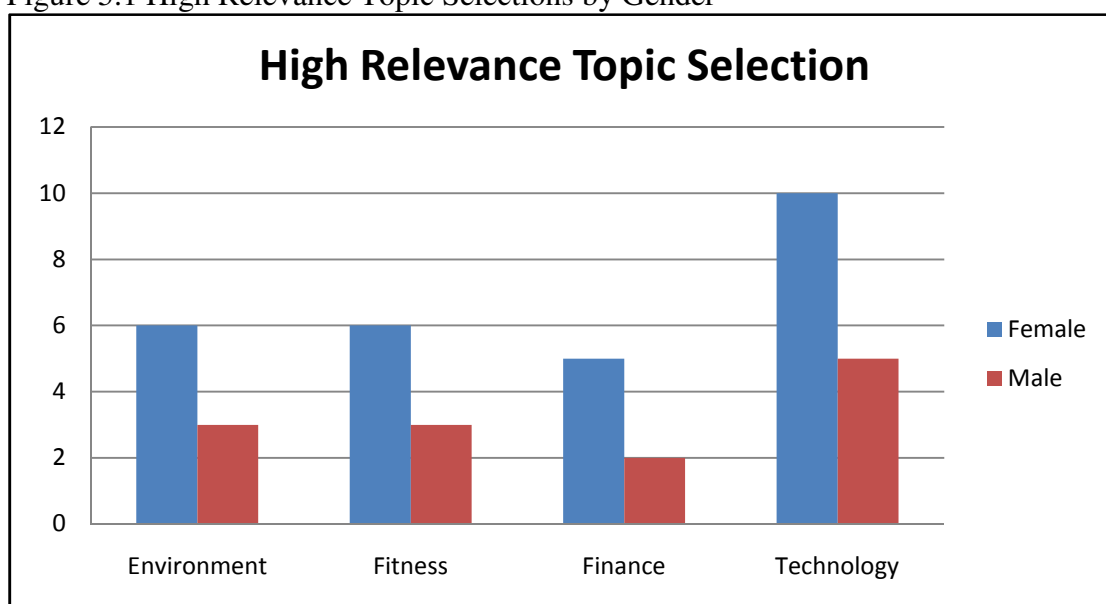
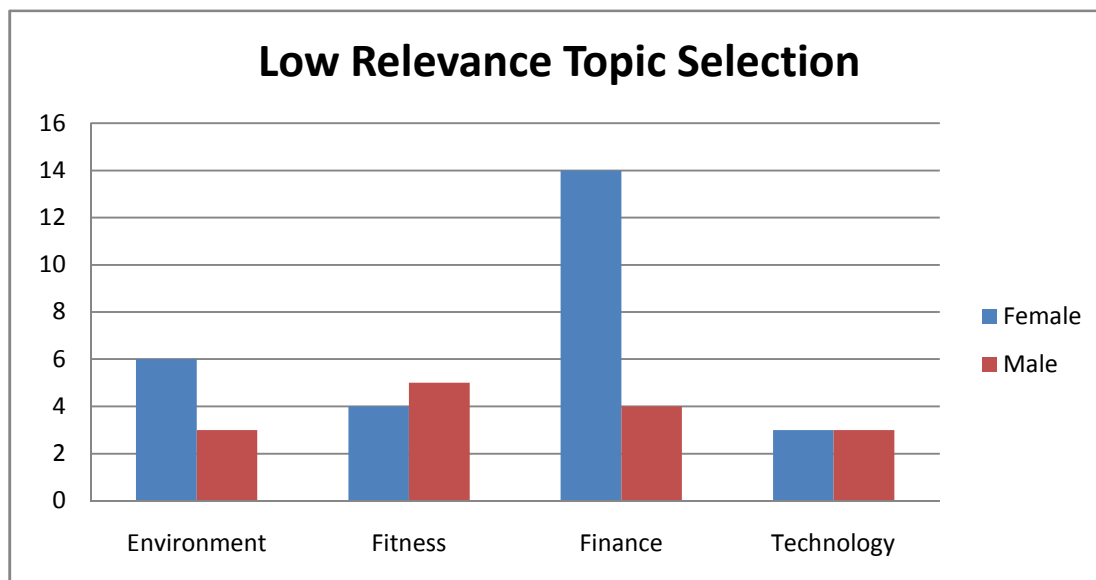


Figure 5.2 Low Relevance Topic Selections by Gender



5.2 Qualitative Analysis and Model Formation

As part of the study the subjects completed a post-search questionnaire in which they asked how they define credibility. In addition they were asked to describe what factors they used when they determined the source and message credibility of information that is presented on the Internet. The subjects' responses were initially coded by the researcher in order to gather overall themes. After the initial themes were grouped by topic and a code book was created, an additional coder was given a sample of the responses to code in order to ensure that the themes gathered through the analysis were valid. In order to measure inter-coder reliability Holsti's (1969) formula was used: $C.R. = 2M/N1+N2$. Where C.R. refers to coder reliability, M refers to the number of coding decisions on which the two coders are in agreement, and N1 and N2 refer to the number

of coding decisions made the researcher and outside coder respectfully. In order to assess how credibility the subjects were asked to answer the following questions: How would you define credibility? Specifically what factors do you take into account when evaluating a piece of information for credibility? The subjects were also asked to identify the factors that they used in order to evaluate the source and message credibility when evaluating information that is presented on the Internet.

All forty questionnaires were coded by the researcher eleven were randomly selected to establish inter-coder reliability. Two of the questionnaires were used in order to train the coder on the themes that the researcher was interested in exploring. After the training the coder was asked to independently evaluate nine subjects' post search questionnaire responses. The sample represented 22.5% of the total population.

The first question concerned how individuals defined credibility and the factors they take into account when evaluating a piece of information for credibility and the coder identified 39 themes while the researcher identified 36, there was agreement with 34 of the themes selected. The coder reliability for this question was $.91 \text{ C.R.} = \frac{2(34)}{(39+36)}$. The second question asked the subjects how they evaluate the source of the information on the Internet for credibility. The coder identified 39 themes while the researcher identified 35; there was agreement on 32 themes. The coder reliability for this question was $.86 \text{ C.R.} = \frac{2(32)}{(39+35)}$. The third question asked the subjects how they evaluate the message credibility of information that is presented on the Internet. The coder selected 42 themes while the researcher selected 41; there was agreement on 39 themes. The coder reliability for this question was $.94 \text{ C.R.} = \frac{2(39)}{(42+41)}$. Overall

across the three questions the average was $C.R. = .90$, this level is considered above the “acceptable” level for drawing conclusions in qualitative studies (Krippendorff, 2004).

5.2.1 User Credibility Definitions

The subjects identified several components of credibility. Table 5.2 identifies the concepts that the subjects identified as relating to credibility.

Table 5.2 User Defined Credibility Constructs

Construct	Related Topics	Example	Number of Occurrences
Trustworthy		Credibility is whether I can trust the information or not. (User 11)	7
	Reliable	For information to be credible it must come from a reliable and trustworthy sources. (User 16)	1
	Believability	Credibility is the ability to be believed. (User 2)	7
	Agreeability	Consistency with previously known information well written, organized, focused on topic. (User 9)	3
Competence		Are they knowledgeable in their fields and educated in their field. (User 24)	3
	Accuracy	Factors: Bias, accuracy, etc of source. Does the information agree with the rest of the body of knowledge on a topic? (User 12)	4
	Knowledge of Topic	Credibility is general acceptance of a	2

Construct	Related Topics	Example	Number of Occurrences
		person's/source's knowledge of topic and integrity of presentation. (User 6)	
Goodwill		I define credibility in terms of the level of accuracy and honesty a source/site has. (User 41)	1
	Un-Biased	Balanced, objective reporting of a topic or event. (User 32)	7
	Funding	Factors: source of information, reviews, source of funding (User 12).	1

These results show that credibility is composed of three main components: trustworthiness, competence, and goodwill. These results support the model that was presented in chapter 3.

Trustworthiness is defined as being worthy of belief (Wilson 1983). Fourteen subjects (35%) have stated that in order for them to find a source of information credible that they must be able to trust the source. Subjects also stated that in order for them to find a source to be trustworthy they must find that the information that they are presenting to be believable (17.5%). Related to the concept of believability is the concept of agreeability. Agreeability refers to how a piece of information presented is reconciled with the user's present beliefs. Three subjects (7.5%) believed that agreeability was important to them when evaluating the trustworthiness of the piece of information. One subject (2.5%) stated that in order to be trustworthy a source must be reliable.

The second component of credibility that was mentioned by the subjects was competence. Nine subjects (22.5%) mentioned competence as a factor in establishing

credibility. Competence requires that the information be both believable, as well as, come from a source that is authoritative (Fogg and Tseng 1999). Four subjects (10%) mentioned accuracy as an important component of competence. Two subjects (5%) mentioned knowledge of topic as an important criterion in evaluating the competence of an information source.

The third component of credibility is goodwill. Goodwill is defined as how the subject perceives the intent of the information source with regards to their well being (Wilson 1983). Nine subjects (22.5%) found that goodwill was important in establishing the credibility of an information source. Seven subjects (17.5%) stated that in order for them to believe that a website has goodwill towards its users the information that is being presented must be un-biased. One subject (2.25%) mentioned that the source of funding influences how she perceives the goodwill of the website's author.

The second part of the first questions asked what factors the subjects took into account when evaluating the credibility of a piece of information. Table 5.3 identifies the factors that the subjects use when assigning credibility to an information source.

Table 5.3 User Identified Factors Used in Evaluating Credibility

Construct	Related Topics	Example	Number of Occurrences
Content		Content of message: supporting evidence can be corroborated. (User 8)	5
	Completeness	Presents Complete Facts. (User 30)	1
	Currency	Recent Support: shows ability to be consistent over time. (User 5)	5
	Language	Language: use of correct grammar,	3

Construct	Related Topics	Example	Number of Occurrences
		sensitive to browsers	
Experience		My knowledge of the site from previous experience or general knowledge about the ideas or topic. (User27)	5
Format		I place credence with information well organized and presented. (User 3)	8
	Navigation	Making navigation easy (User 37)	1
Reputation		I also consider who may have pointed me to the site. (User 15)	17
	Domain	Domain name (User 13)	2
	Google Rank	How high on the Google ranking it is shows frequency of use. (User 27)	1
Verification		Credibility, to me, means that I can prove it to be true. I'd check on more than 1 website, back up the most important facts to make sure they are correct. (User 20)	15
	Contact	I look for contact information (actual names, phone numbers, and email) (User 15)	1
	User Comments	Sometimes if other users provide comments about the credibility of the	1

Construct	Related Topics	Example	Number of Occurrences
		website's information is also helpful. (User 14)	

Table 5.3 demonstrates that the subjects identified five broad factors that they identified when evaluating a piece of information for credibility: content, experience, format, reputation, and verification. Three of these factors: experience, reputation, and verification are related to source credibility (Danielson 2006). The remaining two factors; content and format, relate to message credibility (Toms and Taves 2004).

Experience is defined how the user's past experience influences how she or he may view the credibility of information that is presently being evaluated. Individuals are more likely to view an information source as credible if they had previously found that source as being credible. Five subjects (12.5%) mentioned that previous experience with an information source was an important criterion when evaluating the credibility of an information source.

Reputation is defined as the level of esteem that an information source has to an individual that is derived from outside sources. Twenty subjects (50%) identified reputation as an important criterion when evaluating the credibility of an information source. Two subjects (5%) used the domain of a URL to determine the reputation of a website. User 3 mentioned how she is more likely to trust information found in a website with an .edu domain than in a commercial site. This supports findings previously reported that the reputation of a website is related to the reputation of the organization or individual that is presenting it (Fritch and Cromwell 2002). Another aspect that effected how subjects perceived the reputation of a website was the ranking that it received from

the search engine results. One subject (2.5%) found that sites with higher page ranks were perceived to be more reputable.

Seventeen subjects (42.5%) identified verification as instrumental in establishing credibility. Verification is defined as the ability to independently evaluate the information that is being presented (Barry 1994). Verification is composed of two main elements: the ability to independently validate the information that is being presented and the ability to determine the identity of the author that is presenting the information. One subject (2.5%) mentioned that one way to validate the information was to review the comments of previous visitors to the site to see if they had found the information to be useful. Users were also interested in knowing the identity of the individual or organization that was responsible for presenting the information on a website. Subjects found that when they were able to find the contact information on a website that they were able to verify who is responsible for the content.

Nine subjects (22.5%) stated that the format of the website influenced whether they believed that the information presented there was credible. Subjects found that they preferred sites that were well organized and presented in a professional manner. Users stated that they preferred sites that they found easy to navigate through.

The final factor that the subjects identified as being important to determining credibility was the content of the information that is being presented. Content was identified by eleven subjects (27.5%) as important in determining credibility. The subjects further identified three main components of content: completeness, currency, and language. One subject identified completeness as important in determining the quality of the content of information being presented. Completeness refers to the depth and

breadth of the information that was being presented (Xu 2007). Subjects found that the more complete the information was the more credible they found it. Five subjects (12.5%) mentioned currency as an important criterion in evaluating the content of the information. Currency refers to the timeliness of the information that is being presented. Subjects found that the more recent the information is the more likely they were to find it credible. The final component of content that subjects identified was language. Three subjects (7.5%) mentioned that the language used in a website had to be appropriate to audience that it was attempting to reach in order to be credible. In addition, if the text presented on a website had misspellings or grammatical errors then the subjects were less likely to find the information presented as credible.

After being asked to define broadly credibility and the factors they use to determine it, the subjects were asked to specifically explain how they evaluate the credibility of the source of information that is presented on the Internet. Table 5.4 identifies the factors that subjects used when determining the source credibility of an information source.

Table 5.4 Factors Affecting Source Credibility

Factor	Related Topics	Example	Number of Occurrences
Experience		I usually depend on the same websites I have previously validated (User 31)	3
	Used Before	I most frequently return to trusted sites for information. (User 21)	2
Reputation		I tend to believe an organization is credible if I've	15

Factor	Related Topics	Example	Number of Occurrences
		heard of it, t has a good reputation etc. (User 39)	
	Credentials	I look to see what their credentials are. (User 24)	4
	Domain	Is it a official site (i.e. Gov't, public company etc.)	4
	Knows Source	Who is the person? What do I know about them? (User 7)	2
	Source Site Author	By evaluating who the source is. Is it a academic source, public opinion or presented by a well-known organization or person is how I determine the credibility. (User 29)	7
	Source Rank	In the results of a search on the search engine, select the most well-known websites for the answers. (User 35)	3
	Worked in field	If organization has done work in this area before. (User 12)	1
Verification		As far as news and other events go, I usually consult several different news sources for their takes on the same stories. (User 15)	12
	Comments of Other	For other everyday search I try to read the reviews of other	3

Factor	Related Topics	Example	Number of Occurrences
		users. (User 28)	
	Compare Sites	Credibility evaluated by contrasting multiple sources. (User 28)	4
	Links	If I can find other reputable sources that link to the site (User 2)	2
	Other Media	(User 41)	1
Bias		First I try to evaluate any agenda or “For Profit” status. (User 3)	10
	Ads	Also, I try to avoid any sites that look like advertising. (User 33)	2
Content		I prefer the website which has well-structured and rich information with links and detailed explanation. (User 11)	3
	Formatting and organization	The look and feel of the site, how easy it is to use. (User 21)	8
	Writing Quality	Is the information is well written. (User 19)	4
	Logical	Is there enough support in the article or write up.(User 3)	1
	Currency	I check for “Last Updated” information. (User 31)	5

The results from the questionnaire demonstrate that there are five broad factors that the subjects used when evaluating the source credibility of an information source on the Internet: experience; reputation; verification, bias, and content. As mentioned

previously experience refers to how useful the subject had found the website in previous information seeking tasks. Five subjects (12.5%) tended to return to those sites that they previously found useful. While experience may provide a guide to determining what sources to use when completing an information seeking task, it is not useful if the subject is confronted with a new information source. In order to evaluate a new information source the subjects focused on two factors: reputation and verification.

Reputation refers to as being held in high esteem. Thirty subjects (90%) tended to focus on the perceived reputation that a website's author has when determining the credibility of the information that is being presented. When attempting to determine the reputation of an information source the subjects focused on the following: the credentials the website presented, the domain of the website, if they previously heard of the source, source rank, and lastly if the website author had previously worked in the field.

Credentials refer to the evidence that the website can present that it is knowledgeable about the information that is presented. This is closely related to whether the source has previously worked in the field. Credentials and previous work tend to establish cognitive authority within a certain topic area by establishing the source's competence. This perceived level of competence is enhanced if the user has previously heard of the author organization that is responsible for the material. In addition to the credentials that a website may present, the subjects focused on the domain to which the website belonged. Subjects identified that they tended to trust domains from either government sources (.gov) or educational sources (.edu) then commercial sites.

In addition to the reputation of the source that is presenting the information subjects were also interested in the ability to validate independently the information that

is being presented. This verification could occur through several means. Twenty one (55%) of the subjects mentioned that they would compare the information presented on one site to information that was presented on other sites. In addition, the subjects found it useful when the website would include links to other sites which could validate the information that was being presented. One subject also mentioned that he compared information that he found on the Internet with other media sources.

Twelve subjects (30%) also identified bias as affecting how they evaluate the source credibility of a website. Bias is defined as the practice to influence in a particular, typically unfair direction; prejudice. Subjects preferred that sites present balanced perspectives to the information that is being presented. Additionally subjects found that sites that had advertisements tended to be less credible.

Subjects also evaluated the content when attempting to determine the source credibility of the information that is being presented. The following factors influence how subjects evaluated the content of the information that is being presented: formatting and organization, writing quality, currency, and how logical the subjects found the information.

Content is closely related to message credibility. Subjects were asked to define message credibility and the factors they used in order to evaluate it. Table 5.5 identifies the factors that subjects used when determining the message credibility of an information source.

Table 5.5 Factors Affecting Message Credibility

Factor	Related Topics	Example	Number of Occurrences
Content		When evaluating the credibility of the message, I first determine if I personally suspect a bias – Then I examine the information provided and decide if it seems well balanced. (User10)	4
	Accuracy	I check for the timeliness and accuracy of the information and sources presented.(User31)	7
	Depth	I look at the level of detail around the topic.(User 35)	2
	Language	I evaluate the message on the way in which the site uses language. Is the language appropriate? (User 33)	2
	Logical	I look to see if other places repeat, if info is logical and supported with evidence. (User 2)	9
	Relevancy	If it fulfills my personal interest I'll then rate its level of credibility. (User 41)	1
	Timeliness	Is it current (i.e. not dated) (User 30)	5
Format		By evaluating the source, content and format (User 29)	1

Factor	Related Topics	Example	Number of Occurrences
	Organization	I check to see if the message is organized and written without any grammatical errors. (User 19)	3
	Presentation	Is the information presented in a professional manner i.e. well written, no spelling errors. (User 36)	5
Verifiable		I check multiple sources including newspapers and local/national media.(User 23)	20
Source		I look to see who has posted/provided the information. (User 24)	9

As table 5.5 demonstrates there are four main components that the subjects used when evaluating the message credibility while engaging in information seeking task on the Internet: content, format, the ability to verify the information, and the person or organization that is responsible for posting the information. Thirty subjects (75%) mentioned content when evaluating the message credibility of a website. Content refers to the actual information that is being presented. Several factors were identified that contributed to how subjects evaluated the content of the information that is being presented: accuracy, depth, language, logical, relevancy, and timeliness. Seven subjects (17.5%) mentioned accuracy as a factor in determining message credibility. Accuracy refers to how truthful the subjects believe the information is. Depth refers to the level of detail that the information contains; it was mentioned by two subjects (5%). Language

refers to the grammar and vocabulary that is used to present the information. Logical refers to how well articulate the argument presented is. Two subjects (5%) mentioned language as an important factor. One subject mentioned relevancy which refers to how topical the information presented is to the information need. Lastly timeliness refers to how current the information is and was mentioned by five subjects (12.5%).

In addition to the content of the message the subjects also mentioned format as important in evaluating the message credibility of the information that is being presented. Eight subjects (20%) mentioned format as being important. The subjects mentioned two main components when evaluating format: organization and presentation. Three subjects (7.5%) mentioned organization as being important when evaluating the format of a website. Five subjects (12.5%) mentioned presentation as being important to the evaluating the format.

There was also a great deal of overlap between the criteria that subjects used to evaluate the message credibility and those used to measure source credibility. Twenty subjects (50%) mentioned the ability to independently validate the information presented on a website. In addition nine subjects (22.5%) mentioned source as being an important criteria when evaluating the message credibility of an information source.

5.2.2 Task Complexity

In order to measure task complexity two constructs were used: the amount of time it took the subjects to complete the task and the number of websites the subjects viewed in order to get the information. These measures were adapted from earlier studies of task complexity while searching on the Internet (Kim & Allen 2002, Saracevic and Kantor

1988). It is posited that subjects will visit more websites to complete the complex task. In addition it is posited that complex tasks take longer to complete.

In topics of low relevance, subjects visited more websites to complete a complex task ($M = 6.23$, $SE = .361$), than to complete simple tasks ($M = 2.72$, $SE = .260$, $t(38) = 9.62$, $p < .01$, $r = .84$). In topics of high relevance, subjects visited more websites to complete a complex task ($M = 6.59$, $SE = .501$), than to complete simple tasks ($M = 2.26$, $SE = .183$, $t(38) = 8.83$, $p < .01$, $r = .82$).

With respect to time required, measured in seconds, to complete a task for low relevance topics subjects took more time to complete complex tasks ($M = 426.44$, $SE = 19.83$), than to complete simple tasks ($M = 224$, $SE = 19.01$, $t(38) = 9.01$, $p < .01$, $r = .83$). In topics of high relevance subjects spent more time completing complex tasks ($M = 375.77$, $SE = 17.46$) than to complete simple tasks ($M = 224.15$, $SE = 19.01$, $t(38) = 6.46$, $p < .01$, $r = .72$).

Logistic regression was run in order to determine if there is a relationship between task complexity and the number of pages viewed and the time it takes subjects to complete a task. In addition the individuals were asked how difficult they perceived the task to be. Table 5.6 summarizes the results of the analysis.

Table 5.6 Task Complexity Regression (Task Complexity Dependant Variable)

Variable Included	B(SE)
Constant	-5.59(.908)
Pages Viewed	.85(1.93)
Total Time	.007(.003)

$p < .001$ $R^2 = .53$ (Cox & Snell), $.70$ (Nagelkerke) $\chi^2 = 30.93$

As table 5.6 illustrates there was a significant relationship between the pages viewed and total time spent to complete and the task complexity. However the perceived difficulty of the task did not seem to influence the task complexity.

5.2.3 Personal Relevance

With respect to the degree of personal relevance two measures were used: the number of times the subjects searched for the topic in a given week and the last time the subjects have searched for the topic measured in days. If a subject could not recall the last time they searched for a topic a value of 730 was used.

There was a significant difference in the number of times a week the subjects searched for the topic they had a high level of interest in ($M = 5.84$, $SE = 1.33$) then the number of times a week they searched for the low relevance topic ($M = .38$, $SE = .16$, $t(39) = 4.30$, $p < .01$, $r = .57$).

In addition there was a significant difference in the amount of time that elapsed since subjects searched for information on the topic they were less interested in ($M = 242.40$, $SE = 46.04$) then in the topic they had a high level of interest in ($M = 26.75$, $SE = 18.60$, $t(39) = -4.82$, $p < .01$, $r = .62$).

Logistic regression was run in order to determine if there is a relationship between personal relevance and the number of times an individual searched on the topic in a given week, as well as, the last time they searched on the topic. Table 5.7 summarizes the results of the analysis.

Table 5.7 Personal Relevance Regression (Personal Relevance Dependent Variable)

Variable Included	B(SE)
Constant	.49(.273)*
Last Time Visited	-.007(.003)**

* $p < .1$, ** $p < .05$ $R^2 = .185$ (Cox & Snell), $.245$ (Nagelkerke) $\chi^2 = 16.33$

As table 5.7 illustrates there was a significant relationship between the last time an individual searched for a topic and personal relevance. However there was no relationship between the number of times the individuals searched for a topic in a week and his or her personal relevance in the topic.

5.3 Credibility Constructs

As illustrated in table 5.2 users identified three main constructs used when evaluating credibility: competence, goodwill, trustworthiness. These three constructs were also identified in the model presented in figure 3.1.

Table 5.8 illustrates the questions that were used to measure the construct of goodwill.

Table 5.8 Questions Regarding Goodwill

Question Number	Text
21	This website seems to have my best interest in mind.
22	This website seems to be concerned with its users.
23	This website seems to be sensitive to the needs of its users.

Question 21 asked the subjects to measure the degree to which they believed the website had their best interest in mind the mean score was 65.96 out of 100 (SD=21.36). Question 22 asked the subjects if they believed the website's author was concerned with its users, the mean score was 72.30 out of 100 (SD=18.42). Question 23 asked the subjects to rate the level of sensitivity that the website had to the needs of its users, the mean score was 69.01 out of 100 (SD=19.42).

The overall Cronbach alpha between the three questions was $\alpha = .885$. Table 5.9 contains the inter-item correlation matrix of the three questions. There was no item if removed that would lead to an increased alpha.

Table 5.9 Goodwill Question Inter-Item Correlation

	q21	q22	q23
q21	1.000	.703	.698
q22	.703	1.000	.795
q23	.698	.795	1.000

Regression analysis was run to determine the effect of goodwill has on the credibility that is being presented. Table 5.10 provides a summary of the analysis.

Table 5.10 Goodwill and Credibility

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.647 ^a	.418	.415	13.446
2	.678 ^b	.460	.453	12.996

a. Predictors: (Constant), q22

b. Predictors: (Constant), q22, q23

Overall there was a significant relationship between the degree that subjects perceive the website's author concern with its users and overall credibility; $R^2 = .46$ (158) $p < .001$. Using the stepwise method it seems question 21 did not add any explained variance to the model.

The second construct that was identified by subjects was competence. Competence is defined as being knowledgeable in the field (Wilson 1983). Table 5.11 illustrates the questions that were used in order to measure the construct of competence.

Table 5.11 Questions Regarding Competence

Question Number	Text
18	This website seems competent.
19	This website seems to be well informed.
20	This website seems to be written by experts in the field.

The mean score for question 18 was 80.46 out of 100 (SD=19.70) on a scale of zero to one hundred. The mean score for question 19 was 81.58 out of 100 (SD=18.37). For question 20 the mean score was 73.24 (SD=26.92). Initially the inter-coder reliability was $\alpha = .870$; however if question 20 was removed the inter-coder reliability was increased to $\alpha = .930$. Table 5.12 contains the inter-item correlation matrix of the three questions.

Table 5.12 Competence Question Inter-Item Reliability

	q18	q19	q20
q18	1.000	.871	.658
q19	.871	1.000	.684
q20	.658	.684	1.000

Regression analysis was run to determine the effect of competence has on the credibility that is being presented. Table 5.13 provides a summary of the analysis.

Table 5.13 Competence and Credibility

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.864 ^a	.746	.744	8.883
2	.872 ^b	.760	.757	8.665
3	.876 ^c	.767	.762	8.565

a. Predictors: (Constant), q19

b. Predictors: (Constant), q19, q20

c. Predictors: (Constant), q19, q20, q18

Overall there was a significant relationship between the degree that subjects perceive the website's author competence with its users and overall credibility; $R^2 = .767$ (160) $p < .001$. Question 19, which asked the subjects to rate how well informed they believed the website was, accounted for 74.6% of the variance. Question 20 which asked the subjects if they thought the website was written by experts in the field accounted for 1.4% of the variance. Lastly question 18 which directly asked the subjects to evaluate the competence of the website accounted for .07% of the variance. With respect to determining competence, it appears that if the information is perceived as being well informed individuals will view it as credible.

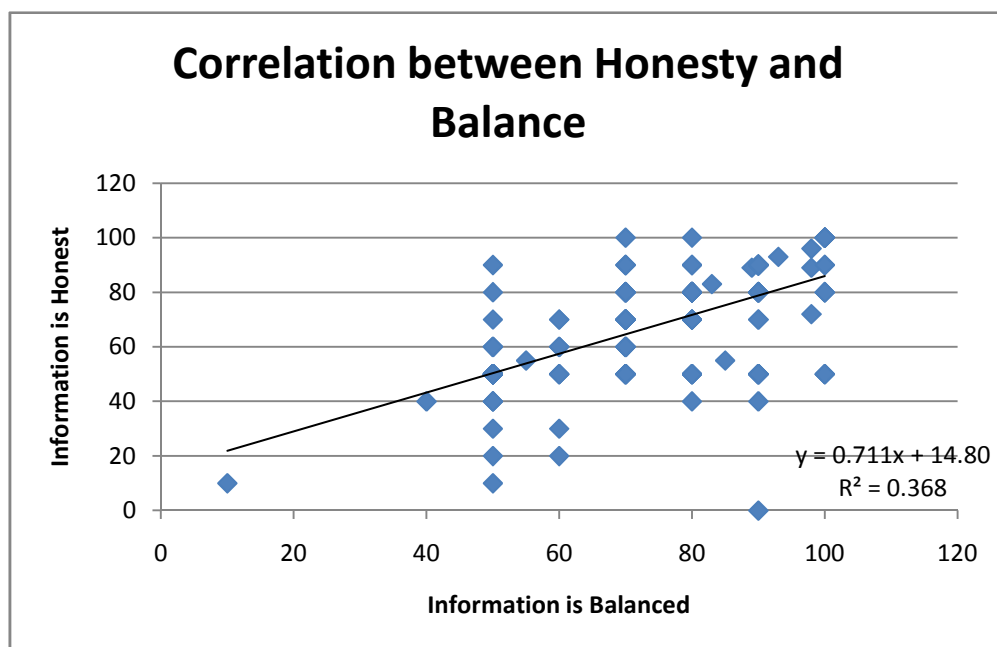
The third component of credibility that was identified by subjects was trustworthiness. Table 5.14 illustrates the questions that were used in order to evaluate the trustworthiness of a website.

Table 5.14 Trustworthiness Questions

Question Number	Text
24	This website seems to be honest.
25	This website seems to provide balanced information.

There was a significant correlation between the perceived honesty of a website and the likelihood that information presented on the website was balanced ($r = .607$ $p = .01$). Figure 5.3 illustrates the correlation between the two items.

Figure 5.3 Correlations between Honesty and Balance



With respect to honesty the mean score was 75.53 out of 100 (SD=17.58). The mean score for balance was 68.57 out of 100 (SD=20.60).

Regression analysis was run to determine the relationship between the perceived honesty and balance of a website and its credibility of. Table 5.15 provides a summary of the analysis.

Table 5.15 Trustworthiness and Credibility

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.731 ^a	.534	.531	12.039
2	.754 ^b	.568	.562	11.626

a. Predictors: (Constant), q24

b. Predictors: (Constant), q24, q25

Overall there was a significant relationship between the degree that subjects perceive the website's author trustworthiness with its users and overall credibility; $R^2 = .568$ (160) $p < .001$. Honesty seems to account for 53.4% of the variance in credibility while balance accounts for 3.4%.

In order to establish the relative importance of competence, goodwill, and trustworthiness on overall credibility regression analysis was run. For each of the components the mean score was calculated for the questions addressing it. The mean for competence was 78.43 (SD = 19.59). The mean for goodwill was 69.09 (SD = 17.87). The mean for trustworthiness was 72.05 (SD = 17.12). Table 5.16 provides a summary of the analysis.

Table 5.16 Competence, Goodwill, and Trustworthiness regressed on Credibility

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.849 ^a	.721	.719	9.313
2	.881 ^b	.776	.773	8.373
3	.887 ^c	.787	.783	8.194

a. Predictors: (Constant), competence_average

b. Predictors: (Constant), competence_average, goodwill_average

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.849 ^a	.721	.719	9.313
2	.881 ^b	.776	.773	8.373
3	.887 ^c	.787	.783	8.194

a. Predictors: (Constant), competence_average

b. Predictors: (Constant), competence_average, goodwill_average

c. Predictors: (Constant), competence_average, goodwill_average, trust_average

Overall there was a significant relationship between competence, goodwill and trustworthiness and overall credibility $R^2=.721$ (158) $p < .001$. Competence accounted for the largest amount of variance (72.1%). Goodwill accounted for 5.5% of the variance while trustworthiness accounted for 1.1%.

The following sections will discuss the factors that influence source and message credibility. In addition analysis will be done on how source and message credibility influence overall credibility

5.4 Source Credibility

As illustrated in the model presented in figure 3.1 initially three components were posited to influence how subjects evaluated credibility: previous experience with the information source, the reputation of the source, and the ability in independently verify the information that is being presented. All three components were included in the responses to the post search questionnaire. In addition as highlighted in table 5.2 the subjects added the following two components: bias and content.

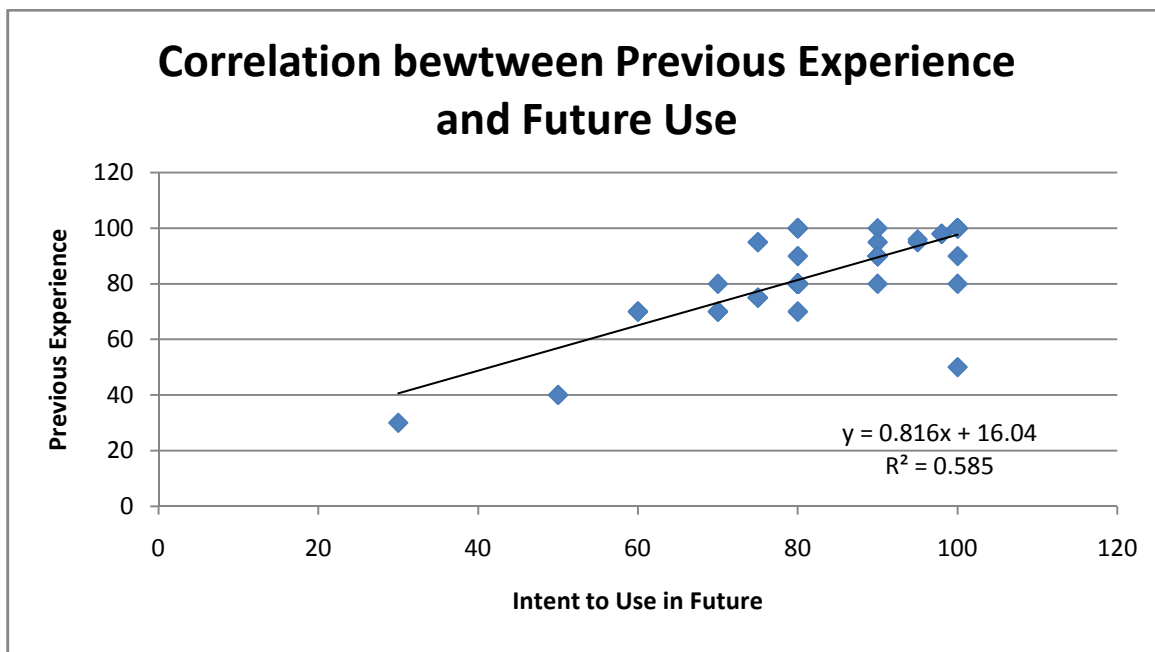
Table 5.17 illustrates the questions that were used to measure the effect that previous experience with an information source has on evaluating the credibility of the information.

Table 5.17 Experience Questions

Question Number	Text
2	I have previously found this website useful when completing an information seeking task.
3	I plan to use this website in the future to complete an information seeking task.

With respect to question 2, fifty-eight subjects (36.25%) identified that they had previously used the website that they were evaluating. The mean score was 85.02 (SD = 13.71). Question 3 addressed the likelihood that the subjects will use the website in the future. The mean score was 60.92 (SD = 29.78). There was a significant correlation between the previous experience with a website and the likelihood that the subject would use the subject would use the website in the future ($r = .765$ $p = .05$). Figure 5.3 illustrates a scatter plot between the two items.

Figure 5.4 Correlation between Previous Experience and Future Use



Regression analysis was run to determine the relationship between previous experience and the intent to use a site in the future and how subjects evaluated the source credibility of a website. When both independent variables were included in the regression

analysis the results were not significant; $R^2 = .023(57)$ $p < .525$. However when only intent to use the website in the future was used to predict source credibility the results were significant but low $R^2 = .066(158)$ $p < .01$. The results appear to demonstrate that previous experience appears to be a suppressor variable with respect to predicting source credibility.

The second component that subjects identified as influencing source credibility was the ability to independently verify the information that is being presented. In the pre-search questionnaire the subjects were asked in general how important it was for them to independently to validate the information presented. The mean score for verification was 76.68 out of 100 (SD =14.39)

Question 7 in the web credibility survey asked the subjects how easily it was for them to verify the information that they were presented with. The mean score was 61.60 out of 100 (SD = 28.63). There was a significant relationship between the ability to independently verify the information and the source credibility of the website $R^2 = .058(157)$ $p < .002$. However it appears that the ability to verify the information presented accounts for little variation when measuring credibility.

The third component of source credibility initially identified in the model was the reputation of the source. Table 5.18 illustrates the questions that were used to measure the effect that previous experience with an information source has on evaluating the credibility of the information.

Table 5.18 Reputation Questions

Question Number	Text
4	The information was presented by an individual or organization that I hold in high esteem.
5	I would recommend this site to someone who was interested in this topic.
6	This website presented credentials that I found valuable.

The overall Cronbach alpha between the three questions was $\alpha = .781$. Table 5.19 contains the inter-item correlation matrix of the three questions. There was no item if removed that would lead to an increased alpha.

Table 5.19 Reputation Questions Inter-Item Correlation

	q4	q5	q6
q4	1.000	.629	.476
q5	.629	1.000	.556
q6	.476	.556	1.000

Regression analysis was run on the three questions and source credibility. Table 5.20 provides a summary model of the regression.

Table 5.20 Reputation Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.581 ^a	.337	.333	15.861
2	.671 ^b	.450	.443	14.494
3	.689 ^c	.475	.465	14.201

a. Predictors: (Constant), q6

b. Predictors: (Constant), q6, q4

c. Predictors: (Constant), q6, q4, q5

Overall there was a significant relationship between the three reputation questions and the overall source credibility; $R^2 = .475$ (158) $p < .001$. The presence of credentials that the subjects found as valuable accounted for 33.7% of the variance in source credibility. The level of esteem that the subject had in the individual or

organization presenting the information accounted for 11.3% of the variance. Lastly, the willingness to recommend the site to other individuals accounted for only 2.5% of the variance.

The subjects also mentioned that content of the website influenced how they judged the source credibility of the information that was being presented. Table 5.21 illustrates the questions that measured content.

5.21 Content Questions

Question Number	Text
12	The information presented is relevant to my information need.
13	The information presented is topical to my information need.
14	The information on the website presented is current
15	It was easy to find the last time the website updated.
16	The coverage of the information on the website fulfilled my information need.
17	The information provided seems to be accurate.

Initially the inter-item reliability was $\alpha = .785$, however if question 15 was removed the inter-item reliability was increased to $\alpha = .878$. Table 5.22 illustrates the updated inter-coder matrix.

Table 5.22 Content Questions Inter-Item Reliability

	q12	q13	q14	q16	q17
q12	1.000	.850	.412	.770	.523
q13	.850	1.000	.454	.668	.525
q14	.412	.454	1.000	.482	.658
q16	.770	.668	.482	1.000	.660
q17	.523	.525	.658	.660	1.000

Regression analysis was run on the content questions and source credibility. Table 5.23 provides a summary of the results.

Table 5.23 Content and Source Credibility

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.771 ^a	.595	.592	12.401
2	.795 ^b	.632	.628	11.854

a. Predictors: (Constant), q17

b. Predictors: (Constant), q17, q13

As table 5.23 shows only two content questions seemed to account for the variance. Overall the amount of variance accounted for was 63.2% ($R^2 = .63$ (158) $p < .001$). Question 17 which addressed the accuracy of the information presented accounted for 59.5% of the variance; while question 13 which concerned the topicality of the information accounted for only 3.7% of the variance. With respect to content the subjects were more interested whether the information is accurate then if it is topical. These results support the earlier findings presented from the interviews.

Regression analysis was run in order to determine how content, experience, reputation, and the ability to verify account for source credibility. For content the mean of each subject's score for question 17 and 13 was used. The mean was 81.03 out of 100 (SD = 17.56). With respect to experience, the mean of question 2 and three was used. If the subject did not answer question 2 then only the score of question 3 was used. The mean for experience was 60.84 out of 100 (SD = 29.49). With respect to reputation the score was the average of questions 4, 5 and 6. The overall mean for reputation was 68.51 out of 100 (SD = 20.31). Table 5.24 provides a summary of the results.

Table 5.24 Content, Experience, Reputation, and Verification Regressed on Source Credibility

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.762 ^a	.581	.578	12.614
2	.798 ^b	.637	.632	11.782
3	.805 ^c	.647	.641	11.641

a. Predictors: (Constant), source_content

b. Predictors: (Constant), source_content, source_reputation_avg

c. Predictors: (Constant), source_content, source_reputation_avg, source_exp_avg

As table 5.24 demonstrates that the ability to independently verify the information does not seem to account for any variance when included with other factors. Overall there was a significant relationship between content, reputation, and experience with source credibility. $R^2 = .647$ (157) $p < .001$. The content of the information accounted for 58.1% of the variance. Reputation accounted for 5.6% of the variance, while experience accounted for only 1%. This shows that individuals are more likely to evaluate the information that is being presented and make a credibility judgment; factors such as reputation and previous experience with the source have only a limited amount of influence on their judgments.

The content of the information was also considered important by subjects when they evaluated the message credibility of a website. The next section will address the factors that subjects used while evaluating message credibility.

5.5 Message Credibility

As the model presented in chapter three posits there are two main factors that influence how individuals evaluate the message credibility of an information object on the Internet: content and format. In addition the post-search interviews of the subjects

identified two additional factors: the ability to verify the information and the source of the information.

Regression analysis was run on the content questions and message credibility.

Table 5.25 provides a summary of the results.

Table 5.25 Content and Message Credibility

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.783 ^a	.613	.611	11.796
2	.819 ^b	.670	.666	10.930

a. Predictors: (Constant), q17

b. Predictors: (Constant), q17, q13

Similar to the results found earlier when regressing content on source credibility, table 5.25 shows only two content questions seemed to account for the variance. Overall the amount of variance accounted for was 67% ($R^2 = .670$ (158) $p < .001$). Question 17 which addressed the accuracy of the information presented accounted for 61.3% of the variance; while question 13 which concerned the topicality of the information accounted 5.7% of the variance. As with source credibility; accuracy seems to be the most important criteria that an individual uses when establishing credibility.

In addition to content subjects mentioned the format of the information that is being presented as important when establishing the message credibility of information that is being presented. Table 5.26 illustrates the questions that measured content.

Table 5.26 Format Questions

Question Number	Text
8	The website is formatted in a way that was easy to read.
9	The website has a professional look and feel.
10	The information in the website is presented in a way that makes it easy to navigate between sections.
11	This website had a search function or a site map that I found valuable.

Initially the inter-item reliability was $\alpha = .759$ however if question 11 was removed the inter-coder reliability was increased to $\alpha = .799$. Table 5.27 shows the updated inter-coder matrix.

Table 5.27 Format Questions Inter-Item Reliability

	q8	q9	q10
q8	1.000	.529	.592
q9	.529	1.000	.590
q10	.592	.590	1.000

Regression analysis was run the format questions and message credibility. Table 5.28 provides a summary of the results.

Table 5.28 Format and Message Credibility

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.519 ^a	.269	.264	16.217
2	.571 ^b	.325	.317	15.627

a. Predictors: (Constant), q8

b. Predictors: (Constant), q8, q9

As the results in table 5.28 demonstrate only two questions appear to account for the variance in message credibility. Overall format accounted for 32.5% of the variance, $R^2 = .325$ (158) $p < .001$. Question 8, which asked the subject how easily he or she was

able to read the information that was presented, accounted for 26.9% of the variance.

Question 9, which asked the subjects to rate the look and feel of the website, accounted for 5.6% of variance.

Regression analysis was run to determine how format, content, and the ability to verify the information affect message credibility. For format the mean score of questions 8 and 9 was used. The mean score was 75.35 (SD = 17.78). Table 5.29 summarizes the results.

Table 5.29 Format, Content, Verification and Message Credibility

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.795 ^a	.632	.630	11.490
2	.802 ^b	.643	.638	11.362

a. Predictors: (Constant), source_content

b. Predictors: (Constant), source_content, message_format_avg

As the results show only the content and the format account for the variance in message credibility. Overall 64.3% of the variance was accounted for $R^2 = .643$ (158) $p < .001$. The content of the information accounted for 63% of the variance. Format accounted .08% of the variance. As mentioned previously the content of the message seems to account for almost all of the variance.

Finally regression analysis was run on the average source credibility, message credibility and overall credibility. The mean score for source credibility 79.14 out of 100 (SD = 19.43). The mean score for message credibility 78.45 out of 100 (SD = 18.91). The mean for total credibility was 80.04 out of 100 (SD = 17.57). Table 5.30 summarizes the results.

Table 5.30 Source and Message versus Total Credibility

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.910 ^a	.829	.827	7.300
2	.938 ^b	.879	.878	6.149

a. Predictors: (Constant), q29

b. Predictors: (Constant), q29, q28

As the results in table 5.30 demonstrate that source and message credibility account for 87.9% of the variance $R^2 = .879$ (158) $p < .001$. Message credibility accounted for 82.9% of the variance while source credibility accounted for 5% of the variation. It appears that what is being said is more important than who says it.

5.6 Factor Analysis

As the previous two sections demonstrate there is a large overlap between the between the criteria that individuals use in order to evaluate source and message credibility. In order address this factor analysis was run in order to establish the unique factors that individuals use when attempting to evaluate information presented on websites.

Initially questions 3 thru 25 were used in the factor analysis. However when the initial correlation matrix was created four questions had a correlation of less than .5 with all of the other questions. Kaiser (1974) suggests that if a scale item does not correlate greater than .5 with at least one other item it should be removed from the analysis. Table 5.31 illustrates the questions that were removed from the analysis.

Table 5.31 Questions removed from factors analysis

Question Number	Text
3	I plan to use this website in the future to complete an information seeking task.
7	I was able to easily verify the information that was presented on this website.
11	This website had a search function or a site map that I found valuable.
15	It was easy to find the last time the website was updated.

Question 3 referred to the likelihood that the subject would use the website in the future. As the results from source credibility showed, experience did not account for a significant amount of the variance. Question 7 asked the importance for subjects to easily verify the information that was presented. While in the post-search interview subjects mentioned the ability to verify information as important to both source and message credibility, however in when this question was regressed on both source and message credibility the results were not significant. The issue may be that while people tend to independently verify information that is presented to them on the Internet, it may not be necessary for every website to provided verification in order to be credible. Questions 11 was concerned if the website had tools that allowed individuals to easily navigate and find information on the websites. Question 15 was concerned if the subjects were able to easily find the last time of the website was updated. Neither of these questions seemed to account for the variance in message credibility.

Principal component analysis was run on the remaining questions. When rotating the results of the component analysis the varimax orthogonal rotation was used. In addition only those factors that had an eigen value greater than 1 were included. Table 5.32 provides a summary of the results.

Table 5.32 Principal Components Analysis

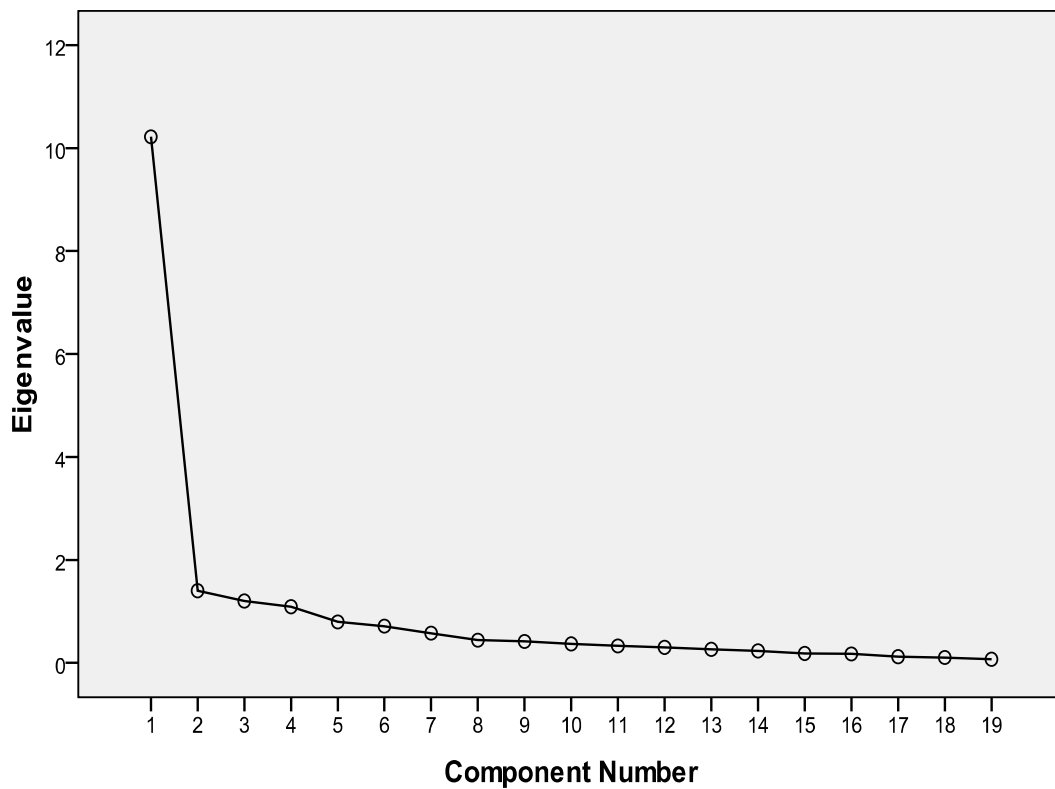
Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	10.219	53.785	53.785	10.219	53.785	53.785	4.653	24.491	24.491
2	1.401	7.375	61.160	1.401	7.375	61.160	3.284	17.282	41.773
3	1.200	6.318	67.478	1.200	6.318	67.478	3.246	17.087	58.860
4	1.091	5.743	73.221	1.091	5.743	73.221	2.729	14.361	73.221
5	.795	4.184	77.405						
6	.713	3.754	81.159						
7	.577	3.035	84.194						
8	.441	2.322	86.516						
9	.417	2.193	88.709						
10	.369	1.943	90.652						
11	.329	1.733	92.385						
12	.302	1.588	93.972						
13	.262	1.381	95.354						
14	.234	1.229	96.583						
15	.183	.962	97.545						
16	.174	.915	98.460						
17	.119	.629	99.089						
18	.104	.549	99.637						
19	.069	.363	100.000						

Extraction Method: Principal Component Analysis.

Figure 5.5 shows the Scree plot of the eigenvalues that were found.

Figure 5.5 Eigen Values

Scree Plot

As the above results show, there were four components that were extracted. The first accounted for 24.49% of the variance, the second component accounted for 17.28% of the variance. The third component accounted for 17.09% of the variance while the fourth components accounted for 14.36% of the variance. In total the four components accounted for 73.21% of the variance. Table 5.33 shows which questions loaded on which component.

Table 5.33 Question Loading

Rotated Component Matrix^a

	Component			
	1	2	3	4
q20	.833			
q19	.759	.421		
q17	.730	.421		
q14	.716			
q18	.684	.439		
q6	.662			
q4	.468			.423
q12		.868		
q13		.825		
q16		.739		
q22			.792	
q21			.778	
q23			.774	
q25	.537		.586	
q24	.456		.554	
q9				.764
q10				.747
q8		.449		.651
q5	.437			.543

Extraction Method: Principal Component Analysis.
 Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 6 iterations.

The first factor was concerned with reputation and competence. Table 5.34 illustrates the components that most load on the first factor. Each question will only be included in one factor. If a question loads on more than one factor it will be included on the one in which it has the highest score.

Table 5.34 Competence Factor

Question Number	Text
4	The information was presented by an individual or organization that I hold in high esteem.
6	This website presented credentials that I found valuable.
14	The information on the website presented is current.
17	The information provided seems to be accurate.
18	This website seems competent.
19	This website seems to be well informed.
20	This website seems to be written by experts in the field.

As table 5.34 illustrates competence is affected by both the source of the information as well as the content of the information. Questions 4, 6, 18, 19, and 20 are concerned with the source of the information. Questions 14 and 17 cover the content of the information. Questions 4, 6, 20 ask the subjects to evaluate the reputation of the source. Question 4 evaluates the degree to which the subject holds the individual or organization presenting the information in high esteem. Fogg and Tseng (1999) demonstrate that individuals found sources as more credible if they found them as being reputable. Question 6 is concerned with the credentials that the website presented. Eysenbach and Köhler (2002) demonstrated that individuals look at the credentials being presented when evaluating the credibility of information that is being presented. Related to credentials is the perception that the source is considered an expert in the field. Question 20 asks the subject the degree they believe that the information presented was written by experts in the field. Berlo et al. (2001) showed that subjects found experts to

be more credible than lay people. Question 19 asks the subject to rate how well informed they believe the website is. Eysenbach and Köhler showed that individuals found well informed websites as being more credible.

With respect to content question 14 asks the subjects to rate the currency of the information being presented. McInerney (2000) showed that individuals found information more credible if it was current. Question 17 asks the subject to address the perceived accuracy of the information being presented. Doll and Torkzadeh (1988) demonstrated that individuals found that evaluated the accuracy of the information when attempting to determine if it is credible.

The inter-item reliability of the competence question is $\alpha = .910$. Table 5.35 shows the inter-coder correlation matrix for the competence factor items.

Table 5.35 Competence Factor Inter-Item Correlation

	q4	q6	q14	q17	q18	q19	q20
q4	1.000	.476	.397	.563	.604	.553	.446
q6	.476	1.000	.585	.504	.451	.557	.658
q14	.397	.585	1.000	.656	.614	.723	.668
q17	.563	.504	.656	1.000	.829	.873	.653
q18	.604	.451	.614	.829	1.000	.870	.661
q19	.553	.557	.723	.873	.870	1.000	.687
q20	.446	.658	.668	.653	.661	.687	1.000

In order to establish an aggregate measure for the competence factor the mean score of the seven items was taken. The mean score was 74.72 out of 100 (SD = 18.56).

The second factor was concerned with the coverage of the website. Table 5.36 illustrates the questions that loaded on this factor.

Table 5.36 Coverage Factor

Question Number	Text
12	The information presented is relevant to my information need.
13	The information presented is topical to my information need.
16	The coverage of the information on the website fulfilled my information need.

As table 5.36 illustrates there are two factors affect the how individuals evaluate the coverage of information that they are presented: the relevancy of the information, and if the information presented fulfills the user's information need. Questions 12 and 13 are concerned with the relevancy of the information. As the model presented in chapter 1 demonstrates prior to determining the credibility of a piece of information; an individual most evaluate if it is relevant to his or her information need. Question 16 is concerned with the coverage of the information being presented. Bhavnani (2005) showed that individuals found that to deeper and broader the coverage of information presented the more credible they found it. Initially the inter-item reliability for the coverage factor is $\alpha = .90$, if question 16 was removed the inter-item reliability was increased to $\alpha = .91$. However given the minimal increase in reliability the question 16 is kept in the factor. Table 5.37 illustrates the inter-item correlation matrix for the coverage factor items.

Table 5.37 Coverage Factor Inter-Item Correlation

	q12	q13	q16
q12	1.000	.850	.770
q13	.850	1.000	.668
q16	.770	.668	1.000

In order to establish an aggregate measure for the coverage factor the mean score of the three items was taken. The mean score was 78.80 out of 100 (SD = 21.87).

The third factor was concerned with how trustworthy the subjects viewed the website. Table 5.38 illustrates the questions that loaded on this factor.

Table 5.38 Trustworthiness Factor

Question Number	Text
21	This website seems to have my best interest in mind.
22	This website seems to be concerned with its users.
23	This website seems to be sensitive to the needs of its users.
24	This website seems to be honest.
25	This website seems to provide balanced information.

As table 5.38 demonstrates there are two main components that influence honesty and balance. Questions 21 and 25 are concerned with the balance of the information that is presented. Kittur et al. (2008) demonstrated that individuals evaluate any potential bias that information source when determining the credibility of the information. These results were also confirmed in the post search questionnaire interviews in which the subjects mentioned bias as a factor they use in order to determine credibility. Questions 22, 23, and 24 are concerned with the perceived honesty of the information source. Toms and Taves (2004) have shown that honesty is a key component that individuals use when attempting to establish the trustworthiness of an information source. The inter-item reliability for the trustworthiness factor is $\alpha = .89$. There was no item if removed would increase the reliability. Table 5.39 provides the inter-item correlation matrix for the trustworthiness factor.

Table 5.39 Trustworthiness Factor Inter-Item Correlation

Inter-Item Correlation Matrix

	q21	q22	q23	q24	q25
q21	1.000	.702	.697	.566	.595
q22	.702	1.000	.794	.624	.537
q23	.697	.794	1.000	.581	.548
q24	.566	.624	.581	1.000	.607
q25	.595	.537	.548	.607	1.000

In order to establish an aggregate measure for the trustworthiness factor the mean score of the five items was taken. The mean score was 70.31 out of 100 (SD = 16.30).

The fourth factor was predominantly concerned with the presentation of the material. Table 5.40 illustrates the questions that loaded on the presentation factor.

Table 5.40 Presentation Factor

Question Number	Text
5	I would recommend this site to someone who was interested in this topic.
8	The website is formatted in a way that was easy to read.
9	The website has a professional look and feel.
10	The information in the website is presented in a way that makes it easy to navigate between sections.

As table 5.40 illustrates there are two components that make up the presentation factor: the format of the website and the likelihood that the subject would recommend the website in the future. It would appear that question 5 as a spurious relationship with the three remaining questions. Kensicki (2003) showed how proper presentation can help improve the perceived credibility of a website. The inter-item reliability for the presentation factor is $\alpha = .83$. There was no item that if removed would increase the reliability. Table 5.41 provides the inter-item correlation matrix for the trustworthiness factor.

Table 5.41 Presentation Factor Inter-Item Correlation

	q5	q8	q9	q10
q5	1.000	.540	.540	.524
q8	.540	1.000	.529	.592
q9	.540	.529	1.000	.590
q10	.524	.592	.590	1.000

In order to establish an aggregate measure for the presentation factor the mean score of the four items was taken. The mean score was 74.79 out of 100 (SD = 17.09).

Regression analysis was run on the average scores of the four factors and overall credibility. Table 5.42 provides a summary of the results.

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.870 ^a	.756	.755	8.707
2	.890 ^b	.792	.789	8.074
3	.894 ^c	.800	.796	7.943

a. Predictors: (Constant), competence_factor_score

b. Predictors: (Constant), competence_factor_score, trust_factor_score

c. Predictors: (Constant), competence_factor_score, trust_factor_score, coverage_factor_score

As table 5.42 illustrates of the factors that influence overall credibility:

competence, trust, and coverage. It appears that the presentation factor does not seem to influence overall credibility. It may be that the presentation of a website initially influences if an individual will visit a website, however once on a site it may not influence credibility. Competence seems to account for the largest amount of variance (75.6%). Trust accounts for 3.6% of the variance and coverage accounts for just .8% of the variance. Coverage like presentation may only affect credibility judgments in the initial stage of evaluation, once an individual determines that material is relevant to his or her information need they rely on other factors to determine credibility.

5.7 Task Complexity and Personal Relevance and Credibility Criteria Selection

This last section will discuss how task complexity and personal relevance affect the criteria that individuals use in order to evaluate the credibility of information that is presented to them on the Internet.

There was a significant association between the task complexity and whether the individual chooses source as the most important criteria when evaluating the credibility of information being presented $\chi^2 (1) = 15.69, p < .001$. This seems to represent the fact that based on the odds ratio individuals were 3.71 more likely to select source as being more important when attempting to complete a complex task.

In addition logistic regression was run to determine if there was a significant relationship between task complexity and the four factors identified in the factor analysis: competence, trust, coverage, and presentation. Table 5.43 provides a summary of the results.

Table 5.43 Task Complexity and Factors Regression (Task Complexity Dependant Variable)

Variable Included	B(SE)
Coverage	-.033(.011)*
Trust	.037(.016)**

* $p < .01$, ** $p < .05$ $R^2 = .08$ (Cox & Snell), $.10$ (Nagelkerke) $\chi^2 = 13.04$

As the results from table 5.39 illustrate there was a significant relationship between the coverage of the website and the perceived trust of the website and task complexity. Coverage is important in more complex task since they require more facets of information in order to be complete (Kim & Allen 2002). Trust is important since the individual may have to rely on the information presented without being able to independently validate the information that is being presented. The remaining two factors competence and presentation are not significantly related to task complexity.

With respect to personal relevance, chi squared analysis was run to see if there was a relationship between personal relevance and the importance and of source selection. There was no significant relationship found. In addition logistic regression was

run on the four factors and personal relevance; again no significant relationship was found.

5.8 Conclusion

This section has presented the results of the research study. The first section provided an overview of the subjects and topics that were used. The next section provided the results the qualitative research gathered during the results of the post search interview, as well as, presented the beginning formulations of a model. The next two sections discussed source and message credibility respectively. The sixth section discussed the factor analysis performed on the survey results. The previous section discussed the role of task complexity and personal relevance and the importance of source in determining credibility.

The next section will discuss the results presented as well as discuss limitations of the study. Finally directions for future research will be discussed.

Chapter 6 Discussion

6.1 Introduction

This chapter summarizes the role of the four factors identified in the previous chapter: competence, coverage, format, and trust, when evaluating the credibility of information presented on the Internet. The considerable overlap between the criteria used to evaluate source and message credibility will be addressed. In addition the effects of task and personal relevance on credibility judgments will be discussed. Included here are the specific results of this study, possible implications, and an assessment of its limitations. Suggestions for future research are also provided.

6.2 Research Questions

6.2.1 Overall Credibility

The first research question addresses how users incorporate credibility when engaging in an information seeking task on the Internet. Evidence gathered from responses to the post-search interview provides information regarding how individuals establish credibility. In particular, subjects were queried to define credibility and what factors they use to evaluate credibility. The results indicate that the subjects used three factors when attempting to determine the credibility of information that they were presented with: competence, goodwill, and trustworthiness. Competence refers to the degree of proficiency they believe the website had on the topic that they were searching. The user's perception that the website has the best interest of its users in mind establishes goodwill. Lastly, trustworthiness is the degree to which an individual believes that an information source is honest.

When attempting to determine the competence of a website the individuals focused on the following: the ability of the website to demonstrate knowledge of topic being searched and the perceived accuracy of the information being presented. Subjects tend to find sources that they believe to be knowledgeable as having more credibility. For example, a user said that credibility was “*the general acceptance of a person’s/source’s knowledge of a topic..*” Accuracy refers to the perceived quality of the information presented. It differs from the factual accuracy because it is the user’s perception of the information presented. In order for an individual to believe a piece of information is accurate it needs to agree with the individual’s prior knowledge of the topic.

The results of the factor analysis reinforce the findings from post search interview. The competence factor was the largest of the four factors accounting for 24.49% of the factor variance. When placed in the regression analysis competence accounted for 75.6% of the variance when regressing on overall credibility. In addition competence is highly correlated with both source and message credibility. Competence accounted for 67.7% of the variance in source credibility and 58.2 % of the variance in message credibility.

When attempting to determine the perceived goodwill of a website the subjects focused on the following factors: bias and who is funding the website. Subjects found that if the website provided balance and objective information they found it to be more credible. Related to bias, the subjects were also concerned with being able to identify the individual or organization who fund the website. Subjects found that being able to determine the source of funding allowed them to determine if they believe there were ulterior motives for presenting the information.

Reliability, believability, and agreeability indicate the trustworthiness of an information source. Subjects identified reliability as coming from a source that they believe is authoritative; in addition, subjects noted that sources need to be accurate to be reliable. Believability is closely related to reliability. Subjects are more likely to view information they find believable as being more credible. Agreeability, the final component of trustworthiness, is how the information presented relates to the individual's presently held beliefs. Similar to accuracy, individuals are more likely to believe a piece of information as being credible if they find the information coincides with their presently held beliefs.

The results of the post search interviews demonstrate that there is a good deal of overlap between the concepts identified when subjects discussed trustworthiness and goodwill. This is consistent with previous research that showed trustworthiness is composed of goodwill (Wilson 1983). The results of the factor analysis also support this finding as trustworthiness was one of the factors identified. The trustworthiness factor accounted for 17% of the factor variance. In addition the results of the regression analysis demonstrates that trustworthiness is correlated with credibility accounting for 3.6% of the variance.

Completeness and currency were factors that subjects mentioned that influence the evaluation of the content of the information. Completeness refers to the depth and breadth of the information being presented. Individuals are more likely to find information that is complete as being more credible. Currency is the timeliness of the information on the website; the subjects identified that more timely information has a higher degree of credibility. The topic being searched greatly influences the importance

that currency plays in evaluating the credibility of information. Several subjects mentioned that when searching for technological information on the Internet, it was important for the information to be timely given the rapid changes in technology. Several subjects mentioned that if the language of the website was inappropriate that they would find it less credible. Language can be inappropriate if it is grammatically incorrect or not written at an appropriate level.

Both currency and completeness are measured in the coverage component of the factor analysis. The coverage factor accounted for 17.2% of the factor variance. The coverage factor accounted for only 8% of the variance in overall credibility. Coverage may only affect credibility judgments in the initial stage of evaluation. Once an individual determines that material is relevant to his or her information need they rely on other factors to determine credibility.

Previous experience often influences how an individual perceives the credibility of an information source. Individuals stated that they are more likely to use sites that they previously found as being useful. The results of the study show that having previous experience with a site explains little variance when determining the credibility of the information presented on the website. It is possible that previous experience may affect the selection of the website to be used to fulfill an information need; however, once selected other factors influence the credibility of the information presented.

Format is mentioned by several subjects as being important when evaluating the credibility of a website. One factor that individuals mentioned as influencing format is the ability to easily navigate through the website. In order to be able to make an informed judgment on the credibility of a website, individuals have to be able to find easily the

information that they are seeking. That is, users who are frustrated navigating a site may not have focused as clearly on key issues of credibility.

The presentation factor encompassed the criteria that subjects used when evaluating the format of a website. The presentation factor accounted for 14.36% of the factor score variance. However it did not account for a significant amount of overall credibility variance. Similar to the coverage factor it may be that individuals focus on the presentation of a website when selecting it but rely on other factors to determine the credibility of the website.

Reputation of the website presenter influenced its perceived credibility by individuals. Subjects found that websites they believed came from reputable sources had a higher degree of credibility. Subjects also looked for implicit cues when attempting to determine the reputation of a website. For example the domain of website influences how the subjects perceive the reputation. Several subjects mentioned that they found government and educational websites as being more reputable than commercial sites.

The last criteria the subjects identified when evaluating credibility was the ability to independently verify the information. Verification occurs through two types of actions: the comparison of the information that is presented on the website with other sites and through the use of hyperlinks presented on the website to substantiate the information that is being presented. Subjects stated they were more likely to find information as being credible if a website provided links that allowed them to independently validate the information presented. In addition individuals found a website as being credible if the information presented on a website was consistent with information on other sites.

6.2.2 Source Credibility

The second research question was concerned with how subjects evaluated the source credibility of a website. The results of the post search interview indicated that there are two primary criteria that subjects identified when evaluating source credibility: bias and content.

Subjects indicate that sources providing bias information are less credible. This result seems to contradict earlier findings by McInerney and Bird (2005) who found that bias did not influence credibility. One possible reason for this inconsistency may be that McInerney and Bird focused on one topic area (Genetically Modified Foods); thus, it may be possible that bias plays a stronger role when examining more than one topic of interest. Alternatively, people may have learned more about bias on the Internet resulting in a maturation effect since the McInerney and Bird (2005) study. While subjects mentioned bias in the post-search interview, the website survey did not address the issue of bias; so it is difficult to quantify the effect that bias may have on credibility judgments.

Formatting, organization, writing quality, currency, and logic are criteria that the subjects identified as being important when evaluating the content of the information. These factors are closely related to the criteria that the subjects determined as being important criteria for evaluating message credibility. This demonstrates that there is a good deal of overlap between the criteria used to evaluate source credibility and message credibility.

The results of the statistical analyses demonstrate that the criteria the subjects mentioned in the post-search interview are correlated with how they evaluated source credibility. Content accounts for the largest amount of variance when evaluating the source credibility explaining 57.8% of that variability. Reputation explains 5 % of the

variance. Prior experience accounted for only .08% of the variance, a trivial amount. It is possible that previous experience with a source may influence the subject's selection of a source, but once selected other factors have a greater influence in determining credibility.

It is interesting to note that the ability to verify information independently was deemed important during the post-search interview; yet, it did not account for a significant part of the variation when evaluating source credibility. This contradiction might be explained by the fact that the web survey asked if it is important that the website provide a way to independently verify the information presented (through hyperlinks, cited sources, user comments, etc.). However, in the post-search interview the subjects mentioned how they would verify information by comparing the information presented on one site with that presented on another. It may be that there are two types of verification: implicit and explicit. Explicit verification occurs when the individual can verify the information presented by resources that are provided by the website. Hyperlinks are an example of explicit verification. Implicit verification occurs when the individual is able to verify that a piece of information is correct by establishing its validity through several sources. The results of this research demonstrate that individuals are more concerned with implicit verification, since that would verify information by using several sources.

6.2.3 Message Credibility

The third research question addressed the criteria that individuals use in order to evaluate the message credibility of a website. As previously mentioned there is a good deal of overlap in the criteria that is used to measure message credibility and those used in evaluating source credibility. Content, format, verification and source were criteria that

subjects identified that they used when attempting to evaluate the message credibility of a website. Of the factors mentioned only format is unique to message credibility.

Organization and presentation are the two factors that the subjects identified as influencing how they evaluate the format of a website. Organization refers to the structure of the website. The results indicate that if individuals are able to easily find the information that they are looking for they are more likely to view the website as being credible. Presentation is the second criteria use to evaluate the format of a website. Subjects state that inappropriate fonts, improper use of grammar, and misspellings tended to make websites less credible. These findings support Petty and Cacioppo (1986) who stated that individuals focused on peripheral cues when evaluating the message credibility of an information seeking source. While presentation is a factor extracted from the factor analysis, it did not account for any of variation in credibility. Similar to coverage, it appears that presentation is important to an individual when initially evaluating a website, however when completing a credibility judgment other factors were more important.

6.2.4 Task and Credibility

The fourth research question examined how the task that the individual is engaged in effects the criteria that they use when evaluating credibility on the Internet. The hypotheses proposed was: The more complex a task the greater the emphasis a user will place on the source of a website when evaluating the information that is presented.

The results of the statistical analysis demonstrate that the complexity of the task influences the criteria used when evaluating information on the Internet. When users engage in the more complex task they were more likely to focus on the source of the

information. In addition the results of the logistic regression show that there are significant relationships between the coverage of the website and the perceived trust of the website and task complexity. When subjects are completing the open ended task they relied more on the coverage and trustworthiness of the site when making a credibility judgment. These results support the hypothesis that when engaging in a complex task individuals are more likely to focus on the source of information.

While there is a relationship between task complexity and the criteria individuals use to make credibility judgments on Internet, more research is necessary to understand further the interaction between task and credibility. One of the questions that need to be addressed is how the stage of task affects credibility judgment. That is, are the criteria used at the beginning of a task the same at the end? Li and Belkin (2008) demonstrate that there are several different facets when individuals complete a task. It would be interesting to see if there is a difference in the criteria used to make credibility judgments during the different facets. In addition, the dichotomy between the tasks that were used in the study may not fully encompass the types of tasks that individuals engage in while searching for information on the Internet. Byström and Hansen (2005) have shown that there are several types of tasks beyond the open and closed tasks used in the study.

6.2.5 Personal Relevance and Credibility

The final research question is concerned with the effect personal relevance has on individuals when evaluating the credibility of information on the Internet. The second hypothesis posited that the higher the personal relevance of a topic the more emphasis that user will place on the source of the information.

The statistical analysis shows that there is no significant difference in the criteria used in evaluating credibility on topics that were of high relevance compared to those of low relevance. In addition logistic regression was run on the four factors and personal relevance; again no significant relationship was found.

One of the reasons for being unable to establish a relationship between personal relevance and credibility is that personal relevance may not have been properly operationalized. The amount of times that an individual searched on a topic, and the last time searched on a topic may have more accurately reflected personal interest than personal relevance. A better way of reflecting how the situation the user is engaged in alters the criteria that he or she will use to evaluate the credibility of the information is to determine what is motivating the individual to complete the information need. It is possible that personal relevance and motivation differ. For example, an information need may be of high personal relevance but of little personal interest. Consider for example a parent searching for information about his or her child's fever; it may not be frequently searched topic, however in this instance the topic would be of high personal relevance. Conversely, an individual may have little motivation in finding the finish line of the New York City Marathon even if the topic of fitness is of high personal interest.

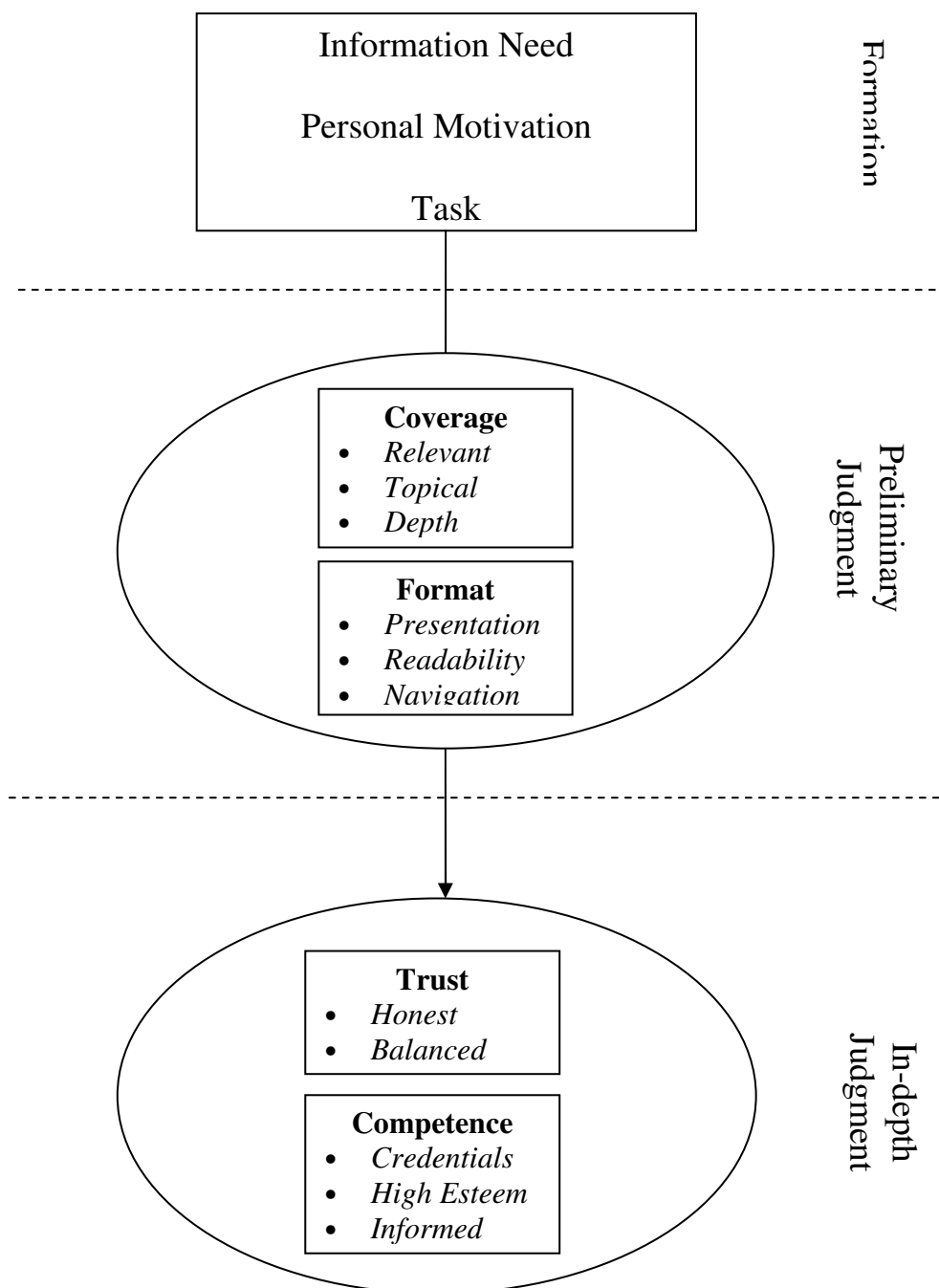
Several researchers (Xu 2007, Taylor et al. 2007) have maintained that the context in which an individual searches for information affects the criteria that they will use in order to evaluate relevance. Further research needs to be done to see how personal motivation affects credibility judgments. One of the difficulties in determining how personal motivation relates to credibility judgments is how to measure it. For example, in a laboratory setting where the tasks were simulated it would be difficult to affectively

capture the level of a subject's personal motivation. However it would be equally difficult to capture an individual's personal motivation in a natural setting. One possible method would be to ask users to keep a diary of their information seeking tasks in which they would self report their level of personal motivation.

6.3 Revised Model

There are some limitations in affirming the theoretical model proposed in Chapter 3 which depicts how individuals make credibility judgments when engaging in an information seeking task on the Internet. For example the theoretical model posited that the criteria used to evaluate source and message credibility were distinct; however, the results of the study demonstrate that there is a good deal of overlap. The revised model below proposes to address these limitations.

Figure 6.1 Revised Model



The square on the top represents the information need that the individual is attempting to complete. As with the theoretical model presented earlier, this need is composed of the level of personal motivation the topic has to the individual and the task that they are attempting to complete. As noted previously the concept of personal motivation differs from personal interest. It is possible that an information need may be of high relevance, but of little interest beyond completing the task. The second component of the information need is the task that the individual is attempting to complete.

The remaining two circles represent the stages that an individual goes through in order to make a credibility judgment on the Internet. The squares in the circles represent the factors that were discovered during the factor analysis of the web surveys. The multi-stages proposed in the model expand on the findings of the Prominence-Interpretation model presented by Fogg and Tseng (1999), which states that credibility judgments are multifaceted. In the preliminary judgment stage an individual engages in a cursory evaluation of the website. Coverage and format are the factors that the individual focuses on during this stage. Coverage refers to whether the information present is useful for the individual. There are several factors that influence coverage: topicality, relevance, and scope. First and foremost the information presented on the website must be relevant to the information need that the individual is attempting to fulfill. In addition to being relevant the information must increase the scope of the individual's knowledge on the topic in order for him or her to fulfill their information need. An individual is unlikely to engage in the cognitive work necessary to evaluate the credibility of an information source if the knowledge gained is redundant.

The second component of the preliminary judgment is format. Format is composed of the following components: ease of use and perceived level of professionalism. If an individual has a difficult time navigating through a website, s/he is unlikely to take the time to evaluate its content. In addition, if the individual believes the language used is inappropriate for the task she or he is attempting to complete then that person would be unlikely to continue further evaluation. Unlike the model presented in Figure 1.1 this model supposes that the stages presented occur in a specific order. It is only after an individual completes the preliminary judgment that he or she will proceed to the next stage.

After the individual completes the preliminary judgment he or she can then make a credibility assessment on the information being presented. The two factors that an individual uses to evaluate credibility are trust and competence. Trust is composed of honesty and balance. As the results of the factor analysis indicate, individuals are more likely to trust information they perceive as being balanced and honest. For example, a person may find a website as being less credible if they believe the site is trying to sell them something.

While it is important for an individual to trust a website in order to find it credible, it also important that they find the source presenting the information to be perceived as being competent. The following factors were shown to influence the perceived competence of an information source: accuracy, timeliness, and reputation. Accuracy refers to how correct the individual believes the information presented is. Timeliness refers to how current the information is. The effect of timeliness is context specific and, for certain fields, such as technology, it was found to be very important.

Lastly the perceived reputation of an information source influences the competence judgment that an individual will assign it. Individuals are likely to judge an information source as competent if they believe that it is reputable.

6.4 Concluding Remarks

The results of the study failed to show that there is a relationship between the level of personal relevance of the topic searched by an individual and the criteria that he or she used to evaluate the credibility of the information presented. It is possible that personal relevance, as it was operationalized here, may not have impacted credibility judgments as expected. Instead, personal motivation—how important a topic is to an individual at a particular point in time—affects how he or she will evaluate the credibility of information. Personal motivation is similar to the notion of personal relevance defined here because it is about the individual's commitment to the topic. However, it differs from relevance in that it is about the need of the individual to have valid and reliable information at a particular point in time.

Xu (2007) has demonstrated that when individuals engage in epistemic searches they use different criteria to evaluate relevance than when they engage in hedonistic searches. Epistemic searches are those searches that an individual engages in order to complete a type of work task; additionally, hedonistic searches concern leisure topics. When people engage in epistemic searches they are more likely to focus on the source of the information than when they are engaging in hedonistic searches. It is possible, then, that when individuals engage in searches of high personal motivation they will be more likely to focus on the source of the information. Xu and Chen (2006) have shown that the context in which the information search is taking place can alter the relevance criteria that

individuals use in order to evaluate information. This relevance, then, will likewise influence the level of personal motivation individuals use in order to evaluate the information that they are presented with.

As shown here, the task that the individual is engaged in has been shown to have an effect on the criteria that an individual uses to evaluate credibility of the information presented. In particular the results presented here show that when individuals complete a complex task they are focused primarily on the source of the information to form an evaluation. Kim and Allen (2002) and Byström and Järvelin (1995) have shown that the complexity of the task affects how individuals search for information. Extending these ideas, the results presented here demonstrate that in addition to altering information seeking behavior, task complexity may also alter the criteria individuals use in order to evaluate credibility.

In general the previously believed dichotomy between source and message credibility does not seem to be applicable in an online environment. Previous research has maintained that individuals use a separate set of criteria to evaluate the source credibility and message credibility of an information object (Wathen and Burkell 2002, Petty and Cacioppo 1986). The results of this study indicate that individuals create overlap between source and message credibility; for example, content was shown to influence both types of credibility. Rieh (2002) maintains that content influenced message credibility. One possible reason for the contradiction is that this study had individuals complete both simple and complex tasks, while Rieh focused primarily on complex task used qualitative methods. Moreover, this study used factorial analysis that allowed for the finding of hidden relationships. In addition, this study broadens the scope

of credibility findings by using search topics from multiple domains. Previous studies often focused on one area or discipline; for example, Hong (2006) studied how individuals evaluate credibility of medical websites. In that situation, the demarcation between source and message credibility was clear cut: individuals were more likely to focus on the source of information when evaluating credibility. However this distinction may be context dependent.

The ambiguous role of verification was also discovered in this study. While individuals mentioned that it was important for them to verify the information presented to them; having such verification on a website was not found here to influence credibility. This apparent contradiction between their voiced beliefs and their actions is an interesting finding that needs further investigation. It is possible that users may have engaged in two types of verification: implicit and explicit. Implicit verification occurs when an individual can instantly verify information presented. Eysenbach and Kohler (2002) demonstrated that individuals found it important for a website to provide external validation to the information that is being presented through such devices as hyperlinks. However, this study demonstrated that having supporting evidence through hyperlinks did not affect how individuals evaluated the credibility of the website. One possible reason for this is that the individuals may not have clicked the hyperlinks in order to verify the information presented since the mere presence of such links provides reinforcement for the content delivered.

The other type of verification is explicit verification. Explicit verification occurs when an individual verifies the information presented with several sources. With respect to the Internet this can occur by comparing information across websites or with other

media sources. Subjects in this study mentioned that when they searched on the Internet that they would compare information across several websites. A risk with this type of verification is that it can lead to source ambiguity (Burbules 2001) although the verifying information is redundant across several sites. Thus, individuals may think that they are independently verifying information when they are not.

6.4.1 Limitations and Future Research

The results of this study indicate that the previously held constructs of source and message credibility may not be applicable to the Internet. Individuals who are searching on the Internet tend not to differentiate between the two types of credibility when evaluating information. Instead individuals focus on the following: coverage, format, trust, and competence.

Some of the limitations of this study include the difference between personal relevance and personal motivation in determining credibility, the effect of task stage on credibility, and the changing nature of the role of the Internet in everyday life and how that may affect credibility judgments. As mentioned previously there is an important conceptual difference between personal relevance and motivation. While this study attempted to judge the effect of personal relevance on credibility judgments, further research is necessary in order to disambiguate these two constructs.

With respect to task, this study has chosen to consider task as an atomic structure. Recent research has shown however that even simple tasks can be composed of several facets (Li and Belkin 2008). Further research is necessary to determine the relationship between task facet and credibility judgments.

Appendix A.1 Pre-Search Questionnaire

ID _____

Pre-Search Questionnaire

Please rank from 1 to 4 the level of interest you have in the topic areas listed below (1=Least Amount of Interest 4=Most Amount of Interest).

1. Finance _____
2. Fitness _____
3. The Environment _____
4. Technology _____

For the topic that you chose as being **most interested** in, how many times in the past week did you search the Internet for this topic? _____

For the topic that you chose as being **most interested** in, when was the last time you searched the Internet on the topic? _____

For the topic that you chose as being **least interested** in, how many times in the past week did you search the Internet for this topic? _____

For the topic that you chose as being **least interested** in, when was the last time you searched the Internet on the topic? _____

For the topic that you chose as being **least interested** in, please rate your level of knowledge concerning the subject matter.

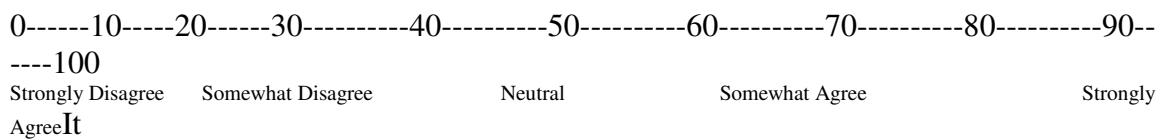
0-----25-----50-----75-----100
 No Knowledge Somewhat Knowledgeable Extensive
 Knowledge

For the topic that you chose as being **most interested** in, please rate your level of knowledge concerning the subject matter.

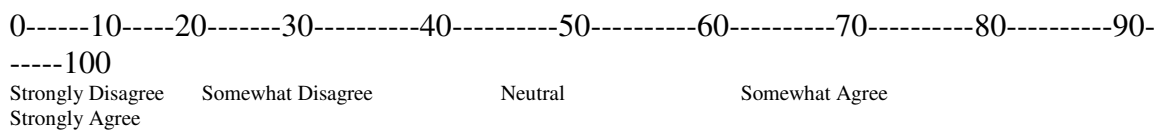
0-----25-----50-----75-----100
 No Knowledge Somewhat Knowledgeable Extensive
 Knowledge

Please answer the following questions regarding how you evaluate information presented on the Internet.

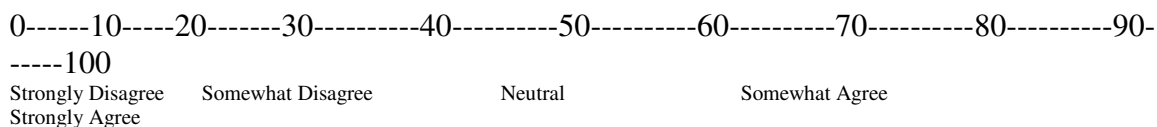
It is important for me to independently validate information that is presented to me.



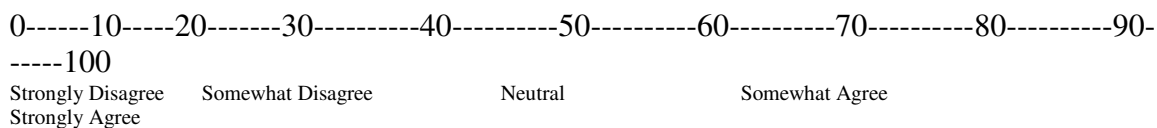
It is important to me that the website is able to provide supporting evidence to the information presented on its site.



Having previously used a website is important to me when evaluating the credibility of the information presented in a website.



Having a search function that makes it easy for me to find information on the website is important to me.



Appendix A.2 Python Script

```

# handling urlGetRequestLog.txt
# many requests, read the log by lines and calculate the diff in the times
# rule one diff between lines > 1000 msec -- evidence for a new url
# rule two reject lines ending in .gif. png jpg swf css js
# 2008 11 02 mc
from win32com.client import *
from easygui import *
#from Numeric import *
import sys
import win32api
import time
import pickle
#import Image
import random
#import _grabscreen
import os
import webbrowser

firstLine=""
lastTime=0
n=0
outfile="urlRequests.txt"
goodfile = "goodUrl.txt"
fsl = open(goodfile,'a')

sites = []

def cleanURL(url):
    special = ['png', 'gif', 'js', 'swf', 'css',
'jpg','google','yahoo','ico','siteadvisor','urs.microsoft.com:443','md5.hackerwatch.o
rg','mscrl.microsoft.com','client.web.aol.com','.xml' ]
    count = 0
    for spec in special:
        flag = url.find(spec)
        if flag != -1:
            count = count +1

    if count == 0:
        return True
    else:
        return False

shape = raw_input("Please Enter File: ")
print shape+"\logUrlRequests'+shape+'.txt'

```

```
fs = open(shape+'\\'+outfile, 'a')

for line in open(shape+'\\logUrlRequests'+shape+'.txt', 'r').xreadlines():

    pieces=line.split('\t')

    if len(pieces) > 1:
        url=pieces[1]
        if cleanURL(url):
            #print url+'\n'
            fs.write(url+'\n')
            sites.append(url)
size = len(sites)
print "Number of Sites "+str(size)+"\n"

seed = random.randint(0, len(sites)-1 )

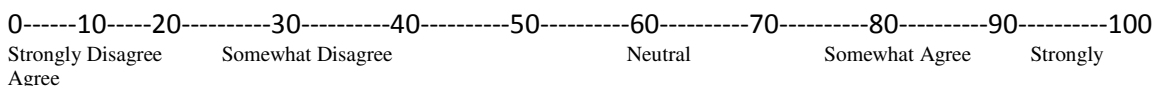
newURL = sites[seed]
webbrowser.open_new(newURL)
```

Appendix A.3 Web Credibility Survey

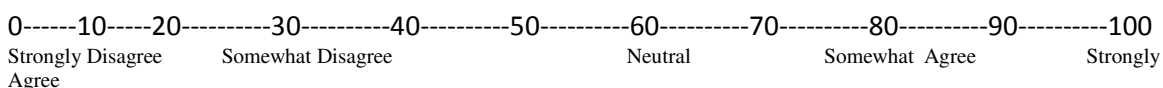
Web Credibility Survey Web Credibility Survey

For each of the questions below, mark the number line where you believe your agreement with the statement is. 0 means no agreement 100 means total agreement. You may write in a percentage that better reflects your agreement than those listed here, i.e. 67%.

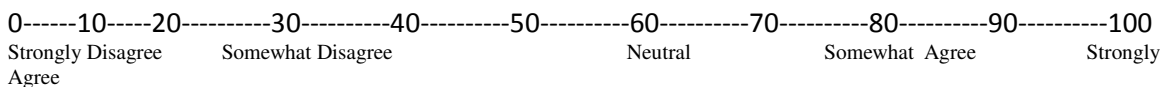
- 1) Having previously used a website is important to me when evaluating the credibility of the information presented in a website.



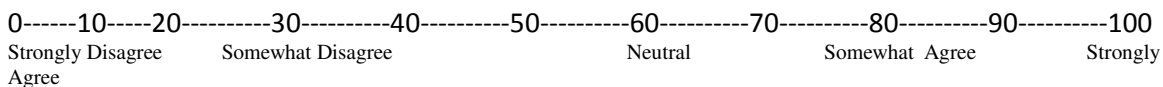
- 2) I have previously found this site useful when completing an information seeking task.



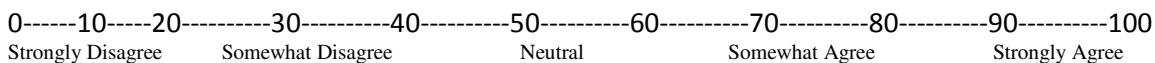
- 3) I plan to use this site in the future to complete an information seeking task.



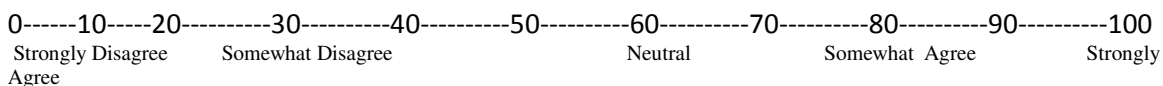
- 4) The information was presented by an individual or organization that I hold in high esteem.



- 5) I would recommend this site to my friends.



- 6) This website presented credentials that I found valuable.



- 7) I was able to easily verify the information that was presented on this website.

0-----10-----20-----30-----40-----50-----60-----70-----80-----90-----100
 Strongly Disagree Somewhat Disagree Neutral Somewhat Agree Strongly Agree

- 8) It is important for me to independently validate information that is presented to me.

0-----10-----20-----30-----40-----50-----60-----70-----80-----90-----100
 Strongly Disagree Somewhat Disagree Neutral Somewhat Agree Strongly Agree

- 9) It is important to me that the website is able to provide supporting evidence to the information presented on its site.

0-----10-----20-----30-----40-----50-----60-----70-----80-----90-----100
 Strongly Disagree Somewhat Disagree Neutral Somewhat Agree Strongly Agree

- 10) The site is formatted in a way that was easy to read.

0-----10-----20-----30-----40-----50-----60-----70-----80-----90-----100
 Strongly Disagree Somewhat Disagree Neutral Somewhat Agree Strongly Agree

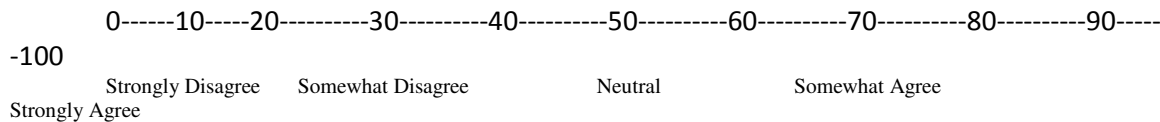
- 11) The site has professional look and feel.

0-----10-----20-----30-----40-----50-----60-----70-----80-----90-----100
 Strongly Disagree Somewhat Disagree Neutral Somewhat Agree Strongly Agree

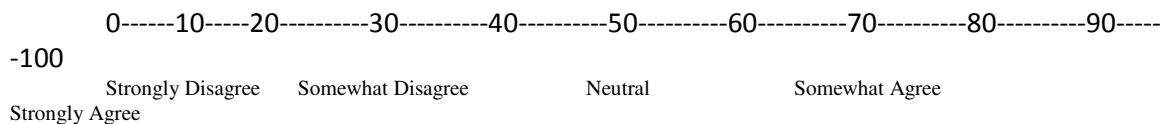
- 12) The information in the site is presented in a way that makes it easy to navigate between sections.

0-----10-----20-----30-----40-----50-----60-----70-----80-----90-----
 -100
 Strongly Disagree Somewhat Disagree Neutral Somewhat Agree

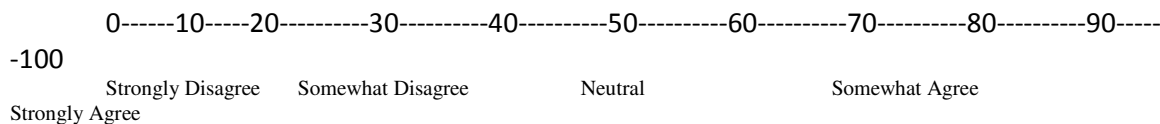
- 13) Having a search function that makes it easy for me to find information on a website is important to me.



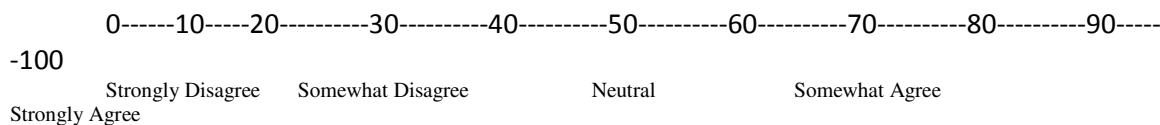
14) The information presented is relevant to my information need.



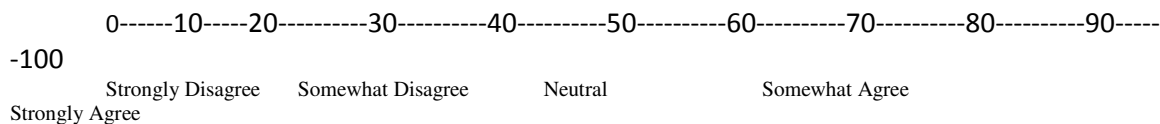
15) The information presented is topical to my information need.



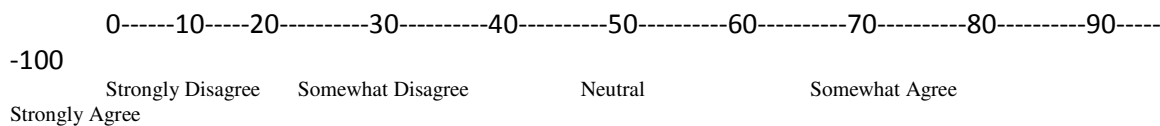
16) The information presented is current.



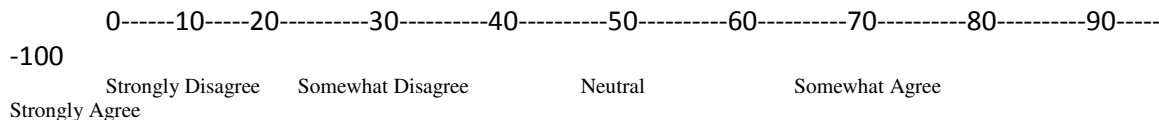
17) I was able to easily find when the last time the site was updated.



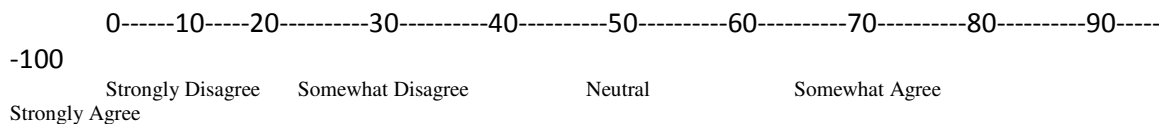
18) The coverage of the information on the website fulfilled my information need.



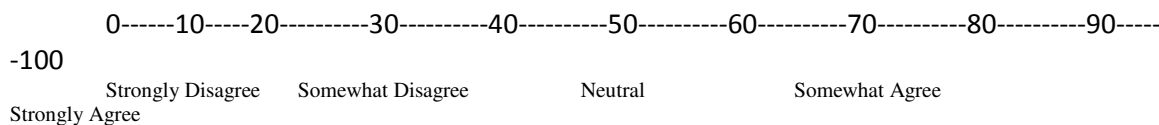
19) The information provided seems to be accurate.



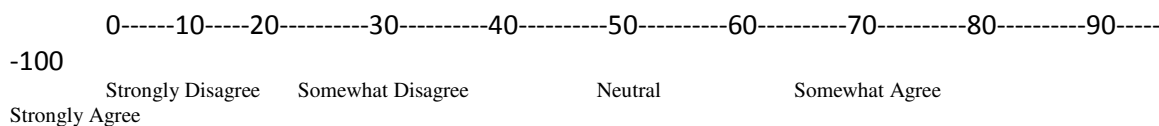
20) This site seems competent.



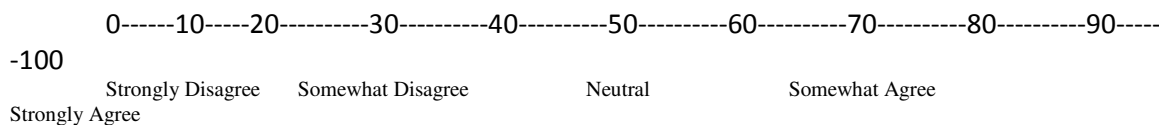
21) This site seems to be well informed.



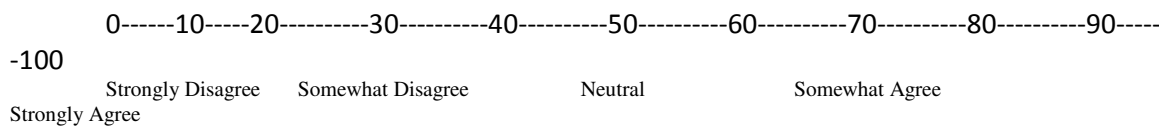
22) This site seems to be written by experts in the field.



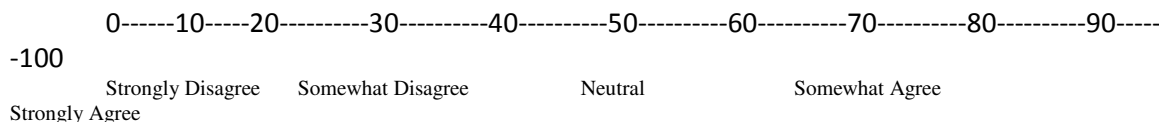
23) This site seems to have my best interest in mind.



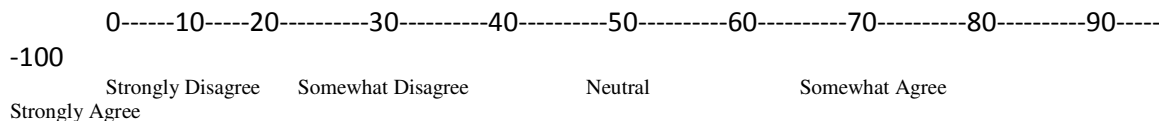
24) This site seems to be concerned with its users.



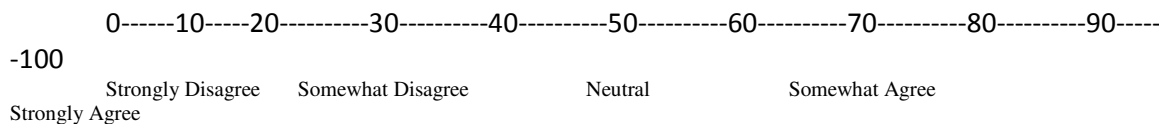
25) This site seems to be sensitive to the needs of its users.



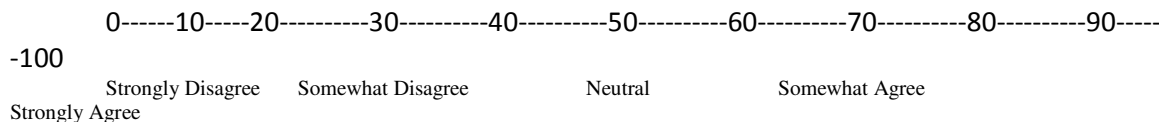
26) This site seems to be honest.



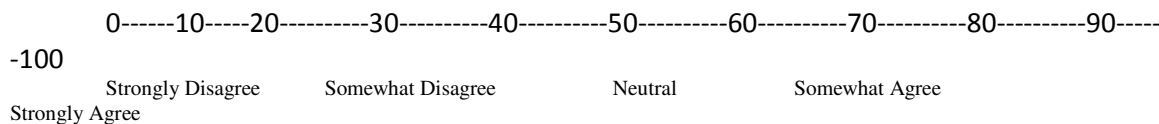
27) This site seems to provide balanced information.



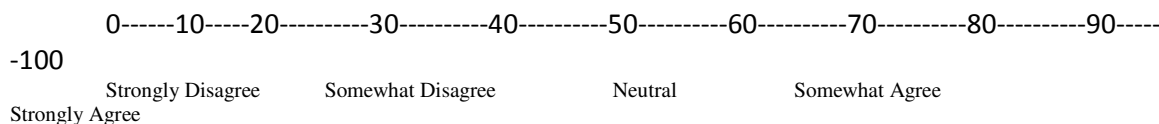
28) I had a hard time finding the information necessary to complete this task.



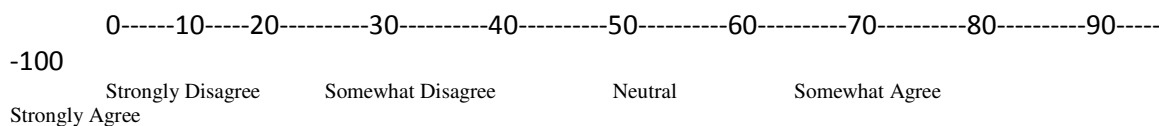
29) I find this topic to be important to me.



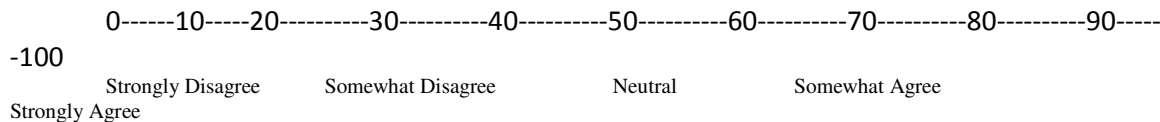
30) Overall I found the source of the information presented on this website as credible.



31) Overall I found the message presented on this website as credible.



32) Overall I found this website to be credible.



Please answer the following questions.

- 1) When evaluating the Source of the information presented on the website please rank the following statements by order of importance. (1=Least Important 3=Most Important)
 - a. I had previously found this site useful _____
 - b. I think this site has a good reputation _____
 - c. I was able to easily verify the information presented on the site _____
- 2) When evaluating the message being conveyed by the website please rank the following statements by order of importance. (1=Less Important 2=More Important)
 - a. The format of the material _____
 - b. The content of the material _____
- 3) Please select what was more important to you when evaluating the credibility of this site.
 - a. The source of the information presented _____
 - b. The message of the information presented _____
- 4) Did you find this site credible? Yes _____ No _____

5. In 3-4 sentences please explain how you evaluate the credibility of the message presented on the Internet.

Age_____

Gender_____

Ethnicity_____

Appendix B.1 Recruitment Materials

Email

To: Students in SCILS's Masters and Ph.D. Programs
From: Andrius Kirkyla
Subject: Participation in a Website Credibility Study

My name is Andrius Kirkyla. I am a Ph.D. Candidate at the School of Communication, Information and Library Studies. For my dissertation, I am studying how task and personal interest affect an individual's credibility judgment while searching for information on the Internet. I am seeking volunteers to participate in a study.

If you participate in this study, you be asked to complete a series of searches on the Internet. The searches will be conducted on a laptop with wireless Internet access. Confidentiality and anonymity for all participants will be maintained. The entire process will take between 1 ½ and 2 hours and can be scheduled at a time that is convenient for you, any day of the week. The sessions can take place either at Rutgers or any place that allows for WiFi access.

You are eligible to participate in this study if you have experience searching the Internet. The success of this study depends upon volunteers, so your participation would be greatly appreciated. If you are interested in participating in this study, or would like to know more about it, please feel free to contact at akirkyla@eden.rutgers.edu.

Thank you in advance.

Andrius Kirkyla

Volunteers Needed For Research Study

Your assistance is requested in a study on credibility judgments while searching the Internet

If you are interested please contact me at

Email: akirkyla@eden.rutgers.edu

Phone: (631) 252-4910

Appendix B.2 Informed Consent Form

Informed Consent Form

You are invited to participate in a research study that is being conducted by Andrius Kirkyla, who is a student and Dan O'Connor who is a professor in the School of Communication Information and Library Studies at Rutgers University. The purpose of this research is to determine the effects of task and personal relevance on credibility judgments while individuals search for information on the Internet.

Approximately 35 subjects between the ages of 20 and 45 years old will participate in the study, and each individual's participation will last approximately 1 ½ to 2 hours.

Your participation will involve the following activities:

1. You will be asked to complete a short questionnaire in which you will be asked to provide some information concerning your Internet use, as well as, your interest in several topic areas.
2. You will be then asked to complete a series of information seeking tasks on the Internet. While completing the task the websites that you visited will be logged. After you have completed the task you will complete a survey and be asked some questions relating to your thoughts about the credibility of the website and its information.
3. After you completed all tasks, there will be a short interview in which you will be able to provide any other insights that you felt were important to helping you determine the credibility of the information presented.

This research is anonymous.

Anonymous means that I will record no information about you that could identify you. This means that I will not record your name, address, phone number, date of birth, etc.

If you agree to take part in the study, you will be assigned a random code number that will be used on each test and the questionnaire. Your name will appear only on a list of subjects, and will not be linked to the code number that is assigned to you. There will be no way to link your responses back to you. Therefore, data collection is anonymous.

The research team and the Institutional Review Board at Rutgers University are the only parties that will be allowed to see the data, except as may be required by law. If a report of this study is published, or the results are presented at a professional conference, only group results will be stated. All study data will be kept for three years.

Please describe any reasonably foreseeable risks or discomforts to the subjects OR state "There are no foreseeable risks to participation in this study."

You have been told that the benefits of taking part in this study may be: developing a better understanding of how people evaluate information when searching the Internet. However, you may receive no direct benefit from taking part in this study.

Participation in this study is voluntary. You may choose not to participate, and you may withdraw at any time during the study procedures without any penalty to you. In addition, you may choose not to answer any questions with which you are not comfortable.

If you have any questions about the study or study procedures, you may contact myself at (631) 252-4910 or by email at akirkyla@eden.rutgers.edu or you can contact my study coordinator, Professor Dan O'Connor at occonnor@scils.rutgers.edu.

If you have any questions about your rights as a research subject, you may contact the IRB Administrator at Rutgers University at: Rutgers University, the State University of New Jersey, Institutional Review Board for the Protection of Human Subjects, Office of Research and Sponsored Programs, 3 Rutgers Plaza, New Brunswick, NJ 08901-8559
Tel: 732-932-0150 ext. 2104, Email: humansubjects@orsp.rutgers.edu

You will be given a copy of this consent form for your records.

Sign below if you agree to participate in this research study:

Subject (Print) _____

Subject Signature _____ Date _____

Principal Investigator Signature _____ Date _____

We would like to ask your permission to use the data collected in this investigation for further research, for demonstrating in teaching, and for presentation during scholarly conferences. If you do not want to give your permission to use your data, you may still participate in this study.

If you agree to let me use the data collected by the questionnaire, please sign this form in the space below. If you do not wish to permit use of your data, do not sign this form. In this case, your data will be destroyed on completion of this study. Also, you have rights to quit without penalty if you wish to.

I, _____, agree that my data provided through this study may be used for research, teaching, and demonstration purposes as described above.

Signature

Date

Thank you very much for having agreed to take part in this study. If you have any questions about the project, or wish to comment, you may reach me at:

Andrius Kirkyla
Ph. D Candidate
School of Communication, Information, and Library Studies
Rutgers University
Email: akirkyla@eden.rutgers.edu
Tel: (631) 252-4910

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Xu, Y., & Chen, Z. (2006). Relevance judgment: What do information users consider beyond topicality? *Journal of the American Society for Information Science and Technology*, 57(7), 961-973.

Andrius Kirkyla

Education

- 2010 ***Ph. D. in Communication, Information, and Library Studies***
 School of Communication Information
 Rutgers University, NJ
 Major: Information Science
 Minor: Research Methods and Statistics
 Dissertation: The Effect of Task and Personal Relevance on Credibility
 Judgments While Searching on the Internet
 Advisor: Daniel O. O'Connor
- 2004 ***Master of Science – Computer Science*** Polytechnic University, Brooklyn,
 NY
- 1999 ***Certificate in Database Development and Design*** Computer Technology
 and Application Program, Columbia University, NY
- 1995 ***Master of Public and International Affairs*** Graduate School of Public
 and International Affairs, University of Pittsburgh, Pittsburgh, PA
- 1990 ***Bachelor of Arts – Economics and Political Science*** State University of
 New York at Buffalo, Buffalo, NY

Teaching Experience

- 2007 - 2008 ***Instructor*** - Introduction to Computer Concepts, Rutgers University, a
 course for undergraduate Information Science Majors. This course
 introduced students to various computer concepts, as well as, provided an
 introduction to programming.
- 2005, 2009 ***Teaching Assistant*** – Database Technologies, Rutgers University
 Graded course work and was a guest lecturer on database design and
 management. Masters Information Technologies for Libraries and
 Information Agencies. Completed teaching of second half of distance
 learning course for Instructor.
- 2005 ***Instructor*** – Distance Learning Technologies, Lithuanian Ministry of
 Education, Vilnius
 Working with the American Professional Partnership for Lithuanian
 Education introduced Lithuanian Teachers to latest distance learning
 technologies

Professional Experience

- 2009-Present **Senior Research Associate:** School of Public Affairs and Administration, Rutgers University Newark Campus. Helped plan and prepare to apply for Federal Grant to provide broadband access to underserved communities in the City of Newark.
- 2008-2009 **Programmer Analyst:** The Foundation Center. Developed web applications using PHP that allowed non-profit organizations and individuals to search for grant opportunities. Developed data model used. In addition created a RSS application that allowed service subscribers to get latest news on potential grant opportunities.
- 2007 – 2008 **Programmer Analyst:** Graduate School, Rutgers University. Developed and maintained real-time website allowing graduate students to seek external funding, including developing the database structure to allow for the website to store and retrieve funding information. This program is used by over 2000 graduate students at the University.
- 2004 – 2007 **Web Architect:** Harry Fox Agency. Developed web based applications using Java technologies that allow music publishers to manage their licensing rights. The front end of the application uses the Apache Struts Framework. The back end is an IBM DB2 database.
- 2000 – 2004 **Senior Developer:** Affiliated Computer Services. Developed web based applications that allowed local municipalities to deliver services over the Internet. I helped design and implement databases using Oracle 8. Wrote SQL queries and stored procedures that were used by the applications to present data to the web application. Developed XML messages to allow the web server to interact with AS400 mainframe.
- 1999 – 2000 **Director of Eastern European Markets Research:** MarketVoyager.com. Founder of an internet-based company to provide financial information regarding global Markets. Content editor for the Eastern European Market's website.
- 1995 – 1996 **Program Coordinator:** Czech Management Center, Prague, The Czech Republic. Database manager for a website designed for foreign investors to the Czech Republic, including website maintenance.

Publications

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Anderson, Dwight., Christie, Erin., Kirkyla, Andrius., Mardenfeld, Sandra., Taylor, Art.
(In Progress). Choosing Media Based on Political Stance.

Kirkyla, Andrius (In Progress). Using hyperlinks to establish cognitive authority on the
World Wide Web

Presentations

Kirkyla, Andrius (2009, October). *Credibility and Websites*. Paper presented at the New
York State Communications Conference. Ellenville, NY

Kirkyla, Andrius. (2007, May). *Hyperlinks and Cognitive Authority*. Paper presented at
the Connections Conference. Philadelphia, PA

Kirkyla, Andrius. (2007, May). *Cognitive Authority on the World Wide Web*. Poster
presented at School of Communication Information and Library Studies Research
Day. New Brunswick, NJ

Kirkyla, Andrius. (2007, April). *Food Safety and Websites*. Paper presented to the Food
Policy Institute. New Brunswick, NJ

Kirkyla, Andrius. (2007, April). *Using Hyperlinks to Establish Cognitive Authority on the
World Wide Web*. Paper presented at the Annual Meeting of the New Jersey
Communication Association Conference, Kean University, NJ

Anderson, Dwight., Christie, Erin., Kirkyla, Andrius., Mardenfeld, Sandra., Taylor, Art.
(2006, April). Choosing Media Based on Political Stance. Paper presented at the
Annual Meeting of the New Jersey Communication Association Conference,
Monmouth, NJ