Chapter 3  Conceptual Framework

This chapter intends to establish a conceptual framework and discuss theoretical issues related to understanding people’s judgment of information quality and cognitive authority. In the first section, an overview of a proposed model of Judgment of Information Quality and Cognitive Authority is described. The following sections explore key concepts that constitute building blocks of this model. One of the goals of this study is to investigate judgment processes with respect to making choices among multiple information sources. Therefore, basic theory and research on judgment, decision, and choice are discussed in Section 3.2 as the starting point for general framework. Section 3.3 examines judgment of quality and authority in the context of an information retrieval framework. This section, in particular, discusses the relationships between IR interaction and relevance judgment, and relationships between relevance judgment and judgment of quality and authority. Furthermore, operational definitions for both information quality and cognitive authority are provided. Then, Section 3.4 introduces a study on judgment of information quality and cognitive authority in the Web conducted by the researcher (Rieh & Belkin, 1998) which serves as an empirical base of the model. This study is included in this chapter because the results of the study had a number of implications which were used to establish a conceptual model.

3.1  Judgment of Information Quality and Cognitive Authority Model

The model, presented in Figure 1, synthesizes theoretical issues related to the following research areas: a) judgment and decision making process in general; b) relevance judgment in information retrieval; c) judgment of information quality and cognitive
authority. It suggests that judgment of information quality and cognitive authority can be considered as a central process of information retrieval interaction which is taking place between the user and information objects in the Web environment. This model further suggests that judgment of information quality and cognitive authority is made in multiple dimensions including goodness, usefulness, currency, accuracy, trustworthiness. It also indicates that, from the user’s side, the judgment is determined by such factors as the user’s task, intention, and knowledge. The user obtains knowledge in two different ways: one from first-hand experience and the other from what we have second-hand (Wilson, 1983). Considering information objects, factors such as presentation, source, content, and format could influence the user’s judgment of quality and authority (Rieh & Belkin, 1998). This model also suggests that there are two kinds of judgment: predictive judgment and evaluative judgments (Hogarth, 1987). Predictive judgments guide a decision about what kinds of action the user is going to take given multiple choices (alternatives). As a result of this judgment, a new Web page is presented to the user. When the user looks at the page, another kind of judgment, evaluative judgment, is made.

Consequently, this model suggests a framework for putting together several basic elements that constitute understanding of judgment processes with respect to evaluating information quality and cognitive authority in the Web. More importantly, this model makes clear some of the relationships between the concepts, including the relationship between relevance judgment and judgment of quality and authority, and the relationship between judgment and actions.
Figure 1. Judgment of Information Quality and Cognitive Authority Model

Judgment Interaction

Information in a Web page
- Content
- Source
- Presentation
- Format

Judgment of IQ and CA
- Goodness
- Usefulness
- Currency
- Accuracy
- Trustworthiness

User
- Task
- Intention
- Knowledge
  - first-hand experience
  - second-hand knowledge

Predictive Judgment

Action

Evaluative Judgment

Predictive Judgment

Iteration
3.2 Judgment, Decision, and Choice

3.2.1 Judgment and Decision Making Process

Research on judgment and decision making suggests a useful framework for understanding the nature of judgment of information in the course of information retrieval interaction processes. Some definitions for the terms to be used in this section need to be explored. According to Rachlin (1989), “a judgment is always a guide for making a decision, which leads to a choice, which then produces an outcome” (p. 43). In other words, a judgment is always a stage in a wider decision process in which a choice is eventually made and an outcome is experienced. A judgment itself is incomplete, and it needs decisions, choices, and outcomes to form a complete process. In this process, the judgment and decision is made internally, but choice is actual behavior that can be directly observed. This leads to the notion that when a person makes a judgment and he/she makes choices based on it, there exist good criteria by which the judgment is determined.

Decision making is often modeled as an adaptive process which can partitioned into subprocesses as follows (Huber, 1989; Rachlin, 1987). The decision process starts with an initial situation in which the decision maker is confronted with a set of alternatives. There is a desired goal situation (goal state) in which exactly one alternative has been chosen. Here the representations of the alternatives are compared. The final stage of the decision process is the conversion of a decision into a choice. Since a theorist cannot see directly into the mind of another person, that person’s actual choice behavior in a given situation constitutes a clue as to what the person’s decision processes might be.
As Huber (1989) notes, the selection of one alternative out of a set of alternatives have been the central topic for decision theory for a long time. Evaluation of information or evidence in alternatives is an importance process. It is that a “promising alternative” may be chosen and tested against the other remaining alternatives. This process can be complex when objects are characterized in multiple dimensions.

3.2.2 Evaluative Judgment and Predictive Judgment

One of the important concepts in this framework is that there are two types of judgment involved in choice behavior: evaluative judgment and predictive judgment (Hogarth, 1987). Hogarth argues that these two kinds of judgment are common to almost all choice situations. First, people make “value judgments by which they express preferences” (Hogarth, p. 1). Hogarth called them “evaluative judgments.” Hogarth’s examples include: people make judgments concerning the quality and interest of the book that people are reading, for more as opposed to less money, for one job over another, for the relative beauty of works of art, and so on. Second, “people make predictions that reflect what they expect to happen” (p. 1). Hogarth called them “predictive judgments.” The examples he has listed are: how long we will need to read this chapter, how someone might react to what you say or do, whether a colleague will be successful in a new job. He further claims that since choice reflects both evaluative and predictive judgments, making a good choice depends upon the extent to which (a) evaluative judgments really translate true preferences; (b) predictive judgments are accurate. Hogarth’s theory is based on the assumption that people are capable of expressing both consistent beliefs (predictive judgments) and consistent preferences (evaluative judgments).
3.2.3 Judgment Process in the Web

While Figure 1 represents the judgment of information quality and cognitive authority in terms of elements which compose the judgment and factors influence that judgment, Figure 2 shows that judgment, decision making, and choice in the Web are continuous processes, and can be characterized in the following subprocesses.

Figure 2. Judgment Process in the Web

Note. $P_i$ = Page, $A_i$ = Action, $PJ_i$ = Predictive Judgment, $EJ_i$ = Evaluative Judgment, $i=1,2,3,...,e$.

When opening a Web browser, people start the search process with a default page of the Web browser ($P_0$). They take the first action ($A_1$) based on their own reasons. These reasons are associated with their predictive judgment ($PJ_1$). They decide to go to $P_1$ because they expect that it is going to be a good place to look or a useful site for the task. The predictive judgment is made before $P_1$ is seen. The reasons for choosing $P_1$...
can be based on their knowledge, experience, recommendation from other people, or
other characteristics of information objects and sources that might be visible on $P_0$.
These are the criteria for predictive judgments. People sometimes combine several
criteria to make a decision (e.g., choice) toward $P_1$. Once they reach $P_1$, they make an
evaluative judgment ($EJ_1$) about the page: for example, how good the information is, how
useful the information is, whether there is a link which seems to be interesting, and
whether they can trust the information. The reasons underlying such a judgment can be
based on some characteristics of information objects, characteristics of sources, the
person’s own knowledge, or other situational factors. These are the criteria for evaluative
judgments. If people find that evaluative judgments of the page do not match the
expectations of their predictive judgments, then they might go back to a previous page or
might decide to start with a new page. When making such a decision, another predictive
judgment is made, and action $A_2$ takes them to the next page. If people find that this page
is what they expected, they continue to use the page by selecting a link on the page, for
instance. Iterating all these actions numerous times, they reach $P_e$ where their predictive
judgments and evaluative judgments match, and they decide to use the information from
$P_e$.

3.3 Operationalized Definition of Information Quality and Cognitive
Authority

In the model presented in Figure 1 and Figure 2, users are considered as active
seekers of information who engage in a wide variety of interactions in the course of
information seeking including comprehension, organizing, modifying, creating,
disseminating, and using the information (Belkin, 1993; Belkin, 1996). In all these
activities, they look for information of potential interest, making judgments about the usefulness or interest of information by engaging with it, and interpreting the information. The basic premise of this study is that making judgments of quality and authority about information is a central process of people’s information seeking.

As discussed in Section 2.1, in information retrieval research, people’s judgment about information has been discussed within a framework of relevance judgment. When people make decisions to accept or reject specific information items, they base their judgments on whether those items are relevant or not. How do they know if they are relevant or not? A number of studies on relevance criteria (e.g., Barry, 1994; Cool, Belkin, Frieder, & Kantor, 1993; Wang and Soergel, 1998) have found that people use much more diverse criteria than mere topicality to make judgments of relevance. The results of these previous studies show that making judgments of quality and authority of information certainly constitutes some dimensions of relevance judgment.

Although this study does not intend to propose a single abstract definition of information quality and authority, it still needs to provide an operationalized definition of these concepts. In Chapter 5, the dimensions of information quality and cognitive authority will be characterized based on empirical findings which are derived from what users say about quality and authority in the context of Web interaction. As a starting point, at a conceptual level, quality is defined as “a user criterion which has to do with excellence or in some cases truthfulness in labeling” (Taylor, 1986, p. 62). Following Wilson’s (1983) definition, cognitive authority refers to the influence on a user’s thoughts that he/she would recognize as proper because the information is thought to be credible and worthy of belief. At an operational level, information quality is identified as
the extent to which users think that the information is useful, good, current, and accurate. Cognitive authority is operationalized as to the extent to which users think that they can trust the information.

3.4 Factors Influencing Judgment of Quality and Authority in the Web

The research reported below (Rieh & Belkin, 1998) was conducted to investigate research problems about judgment of information quality and cognitive authority in the Web. It serves as a preliminary study for the model (Figure 1). The methodology used for the preliminary study was semi-structured interviews with 14 scholars. One of the primary research questions for the preliminary study was whether people are indeed concerned about issues of information quality and cognitive authority when they interact with information in the Web. Another question was whether people apply the same evaluation criteria that they used in traditional information systems to the Web environment. In addition, the questions included identifying criteria people used for judgment of information quality.

The results of the preliminary study (Rieh & Belkin, 1998) indicate that issues of quality and authority are indeed important to people who search in the Web. The subjects had substantial doubts about the general quality of information sources, made comments indicating the necessity to expend more effort on quality and authority assessment in the Web than in other information systems. Their doubts were reflected in the search strategies that they employed. For example, almost all of the subjects said that they would start a search in the Web using a general strategy of finding a “known” site. This was often done by going directly to some specific site to which they had been directed by other people such as expert intermediaries, friends in the faculty, and professors. One of
the subjects in the study explained this technique as a “short cut to expertise,” saying “trial and error in the Web is too time-consuming and too unreliable yet” (p. 284). Another subject mentioned that she “always” checked the Web sites which were listed in the references of a published article because “if this article is referred, the source is probably reliable and important” (p. 284).

When the scholars in the preliminary study were asked whether they could apply the evaluation criteria that they used in traditional information systems to the Web environment, 8 out of 14 respondents said that they used “different rules” for the Web than in other information systems. Three primary reasons for different rules emerged from the responses of these 8 subjects: a) lack of institutional authority of the Web; b) features of information content in the Web; c) physical convenience of the Web. Among them, the most often mentioned reason was the lack of authority in the Web. For example, one faculty member emphasized the problems of authority and credibility of the Web, and illustrated how this aspect affects her searching behavior and evaluation criteria as follows:

I believe that most people who get published and get abstracted in a database have legitimate credentials. So authority or credibility is not something that I’m struggling with...In database searching, my evaluation focuses on content. I say: Is this really useful for my project? Is this telling me something new? Is this something that I’m looking for? In the Web, I am more primarily concerned with credibility and understanding the sources before I get into evaluating the sources.

I also do different kinds of searching (p. 287).

Another example below was what a doctoral student mentioned:
Absolutely different because the Web is a new medium and you can self-publish in the Web...There is no standard. The Web doesn’t exist just for scholarly information like the academic library does. You have to have a lot more filtering devices up front before you even get to the documents that you’re going to make a decision about whether you’re going to use it or not...Because of standards and review process, I can be sure that a larger percentage of what I am going to find in the library is credible information. What I have to do on the Web is to apply all standards and requirements to everything I see because nobody is filtering for me (p. 287).

Regarding the features of information content, one subject said that he might use different criteria because information in the Web tends to be overview information, tends to be less rigorous. About physical convenience of the Web, a doctoral student mentioned that, in the Web, she pulled up some information which was not relevant, but looked interesting because looking at the interesting sites and going back to a prior search was much easier in the Web than in printed sources.

Another significant finding was that the subjects in the preliminary study assessed information quality based on source credibility and authority – at both institutional and individual levels. They paid considerable attention to institutional authority, giving credit to academic and governmental institutions. They also took into account the affiliation of author/creator. They tended to give authority to professional experts such as professors, doctors, librarians, and so on. Other criteria that the subjects used for making judgments of information quality included: content, format, presentation, currency, accuracy, and speed of loading.
These results from the preliminary study were integrated into the model of judgment of information quality and cognitive authority presented in Figure 1 as follows. First, the results indicated that issues of quality and authority are indeed important to people who search in the Web. The judgments of quality and authority may be just one kind of relevance judgment in traditional information systems, but it may compose a central judgment process in the Web environment. Secondly, it was found that all of the subjects would routinely begin their searches in the Web from known, recommended starting points. This result indicates that people’s knowledge needs to be investigated in terms of how it influences their interaction with the information in the Web, which is a relatively new information medium to them. Thirdly, the results indicate that the range of evidence people use for ascribing source authority is much broader than in printed sources, and also that people depend upon such judgments of source authority and credibility more in the Web environment than in the print environment.

3.5 Summary

A conceptual model suggested in this chapter considers judgment of information quality and cognitive authority as a central process of information retrieval interaction. People’s judgment of quality and authority leads to a decision, and decision leads to a choice. As people make choices (e.g., selecting a Web page), they can then interact with a new Web page, and make evaluations, decide what to do next, and make other predictions.

Judgments of information quality and authority are composed of multiple dimensions including goodness, usefulness, currency, and accuracy. Information quality and cognitive authority are not two independent concepts. Rather, they are inter-related,
sharing some common values. For example, trustworthiness and credibility, which constitute key concepts in Wilson’s (1983) cognitive authority, are also critical components for information quality defined by Taylor (1986).

A number of factors can influence this judgment process. From a user’s point of view, there is knowledge which has been accumulated through either first-hand experience or second-hand from others. In addition, a user’s current situation including intention and task are factors relevant to the judgment. From the point of view of Web information, characteristics of information objects (e.g., content, presentation, format) and characteristics of sources are the factors or criteria on which people’s judgment is based.