Management information searching for decision making

S. Lubbe
Department of Information Systems & Technology
University of Kwazulu Natal – Westville Campus
Durban
slubbe@is.udw.ac.za

Contents

Key words: Cognitive, decision-making, evaluation, information, information literacy, knowledge, managers, search-engines, searches

Every eye sees its own special vision; every ear hears a most different song (Koontz from *The Bad Place*)

1 Introduction

This article deals with information that managers need to access and use for decision making. However, the information that is used does not always specify how accurate and up to date it is. Searches are frequently conducted by intermediaries; however managers do not always specify precisely what information they require, the specific period that should be searched, and what should be searched for. This is problematic for searchers.

For a large number of organizations, the efficient use of up-to-date information is a key factor to success in a competitive market. Close links between the management of the business and the searchers of information are therefore imperative. The search programme of any organization should therefore promote the combination of economic and search principles. All departments should participate in the development and application of solutions in pilot information searches, simultaneously sharing the costs and evaluation of the data. Many departments will not be able to work on their own to search for relevant topics. (It might even be an idea to pool resources for similar smaller organizations such as SMMEs.) This article provides some suggestions on how to encourage the staff of any organization to conduct coordinated searches on the WWW.

This article will also investigate how the search for information may be better defined. By 'search', the author means using a search engine such as Google.com, Yahoo, or any of the recognized engines, as well as the rules these engines apply. The parameters of the information search should be defined in terms of the area that needs information or a solution to a situation that has not been solved previously. Other variables used during the search can be defined when they occur or when they are used.

This article therefore contributes to the literature since the amount and accuracy of information affects the searches done as well as the decisions taken. The main question revolves around the type of information required by managers. Little research has been conducted in South Africa in this field and there is a need for this to be explained in the academic environment. The article deals with searches for information that affect managerial decision making. Related areas such as data and knowledge searches are also discussed, and how the manager can determine if the information retrieved is of acceptable quality. The article demonstrates that searches for information on the Internet can be helpful to managers if planned well.

2 Past research

In this section, several aspects that affect information retrieval for organizations and management are discussed. Aspects such as where to obtain the information, strategies to ensure that the correct information is accessed, time, relevance, and quality are all addressed in this section.

2.1 Attention

It might be disheartening for managers to learn that even in respect of a particularly entertaining Website, the attention span of researchers is approximately 20 minutes. Managers need to think about the time and effort it takes to prepare a proper search for information. Managers should not lose heart, as practice makes perfect. Staff should motivate each other, information accessed should be transferred quickly to the people using it, and at the same time provide an overall structure for decision making if it is deemed to be accurate.

Staff should therefore be able to 'hear', see and interact with experts to ensure that the information is correct. Managers need to ensure that they know how *au fait* staff members are with the field they are searching. The search also needs to be tailored to the group or person conducting the search. Managers must ensure that Internet searchers are focused, by interacting with them at all times. Staff should take breaks during their searches. The manager can be an outstanding teacher through leading by example, in respect of information searches.

2.2 Cognitive beliefs

There are not always explanations available on why users behave in particular ways toward information. Some instrumental beliefs are that certain drivers (such as the thirst for information) require some investigation. The two cognitive factors that affect information use are *perceived usefulness* and *perceived ease of use*. Information should have psychometric properties and analysis of the information should sustain the decision that it should support.

Cognitive absorption encompasses:

- the personality trait connotation of absorption (being engrossed with the experience);
- the state of flow (appearing to enjoy the search for information); and
- the notion of cognitive engagement (this relates to the state-of-flow experience).

Not only does the conceptual construct synthesize and integrate prior related information; it extends the body of work by incorporating the dimension of temporal dissociation which, while present in conceptual definitions of related constructs, has been absent from operational ones.

2.3 Competition

The WWW displays striking 'rich get richer' behaviour with a relatively small number of sites receiving a large proportion of hyperlink references; this could influence the search positively (or even negatively) because it affects traffic. A site with bad information will be affected by receiving a plethora of traffic, but the information may be classified as grey. The distribution within specific categories is typically unimodal on a log scale, with the location of the mode, the classification of the information, and therefore the extent of the 'rich get richer phenomenon', varying across categories .

2.4 Costs

There are some primary costs involved in acquiring information. These are monitoring/search costs (including the time, effort, and money expended by an individual in either monitoring a source of information on a regular basis or conducting a focused search for the required information). By the time the manager acquires the information, the costs could be higher, but more relevant. Some of the information will also require transmission costs such as telephone expenses. Costs such as those incurred by the transferral of knowledge should be included (these are required to interpret and acquire the correct information) (Choudhury and Sampler 1993).

The last type of cost is 'opportunity cost'. This is the cost of missed opportunities or losses suffered because the relevant information was not available to the right person at the right time. It is imperative for managers to economize on monitoring/search costs.

Pack (1999) states that ensuring that information is trustworthy will incur costs for an organization. He notes that a great deal of information doesn't pass through traditional filters, and it will be time-consuming to ensure that all the facts on a Website are unbiased or usable. Tillman (2003) supports this statement by noting that it would be a costly exercise to ensure that the information is of high quality and that it meets the stringent criteria.

2.5 Decision making

Grassian (2000) argues that to collect information for decision-making purposes, people need to apprise themselves of the 'audience' and purpose of the Website being visited. Orlikowski and Barley (2001) posit that decision making is influenced by the fact that micro electronic-based information alters the way we live and act. Managers are often trained by multi-disciplinary people, which could also affect decision making. Lee, Lee and Yoo (2002) argue that extended criteria such as reliability, empathy, assurance, tangibility and responsiveness of information affect the decision-making process and that these should be measured before the actual decision is made.

Decisions should only be made where information has been proved to be reliable and responsive. The rapid infusion of information may affect decision making and may be reinforced by drawing from extant theories (Nambisan 2003). Decision making with the

available information as basis is a problem, as multimedia issues could influence people's evaluation of the information on a site. The viewer should bring his or her own critical evaluative questioning to the content before it is used for decision making. Viewers need to take cognizance of the following general criteria for evaluation, and it is an asset if the tools employed can prompt some questions like these below:

- stated criteria for inclusion of information;
- authority of the creator/author;
- comparability with related sources;
- stability of the information;
- appropriateness of format;
- software requirements.

Tillman (2003) notes that the data on the Internet should comply with some of the following characteristics to help with proper decision making:

- Ease of determining the scope and criteria for inclusion; allowing the manager to see whether there is a match with his/her needs;
- ease of identifying the authority of the authors;
- when last updated;
- the stability of the information (can it be relied upon); and
- ease of use in terms of convenience and speed of connection.

Decisions need to be made on informational imperatives that are strong, persistent and compelling, although the rationale could often be flawed and affect the available information.

2.6 Evaluation of data

Markus and Lee (1999) note that researchers providing information should bear in mind the fact that users of information evaluate data and information in terms of their intended use (e.g. decision making). Therefore the agreement should be that all people who have a shared interest in the information should ensure that the data are evaluated properly. Pack (1999) argues that information on the Internet should comply with the ten C's (content, credibility, critical thinking, copyright, citation, continuity, censorship, connectivity, comparability and context). Internet Detective helps by providing an introduction to the issue of information quality on the Internet and teaches the skills required to critically evaluate the quality of Internet sources.

Howe (2001) contends that, in order to evaluate data, one should check the accuracy. Information should state that the facts are accurate. The sources should show what they are based upon and what the users should do to ensure that the information is reliable. There should be little bias present and the author should be an expert in the field. Items with no credentials or references should be regarded as fallible. Evaluation should also be done in such a way that the time and data sources are verified. The information should be compared with comparable sources. One way of using good sources is to ensure that the article has been written by an expert in the field. To select experts, check the number of hits a person's name generates.

Lee (2001) posits that a lack of information literacy can lead to misunderstandings and bad decision making. State-of-the-art information of value to the organization is best captured by recent graduates (especially the socialization part of the information, since they have more knowledge of the Internet.

Tillman (2003) notes that many home pages could be a form of vanity or self-publishing;

however, there are also home pages that have been reviewed and should not be included in the same category. Information on these 'vanity' pages may not be bad but from any information professional or organizational viewpoint, may be suspect. Tillman (2003) further states that grey literature is another category that needs a cautious approach. This comprises a diverse range of documents, *inter alia* comprising pamphlets and preprints. These sites, as well as some of the Internet marketing sites, could be extremely biased. (Tillman cites Amazon.com as an example of such a category.)

Tillman states that some evaluation tools rate information by awarding stars to the source. On the other hand, some search engines generate extra funds by being paid by the source to rate information. He argues that in many cases it makes more sense to use a popular search engine to go directly to material using the manager's search term, than it does to browse through directories or review tools. According to Tillman (2003), there are information clearing-houses that will help with the evaluation of data according to criteria such as level of resource description, level of resource evaluation and organizational schemes. The level of meta-information is also important and will help with the evaluation of the data. He argues that information on the Internet is extremely volatile, and managers should learn to use (or expect their searchers to use) an intermediary tool such as a clearance guide. Information should also be compared with other sources. Managers should also conduct a quality check to ensure that the information is relevant. If the manager notes shortcomings, he or she should speak to the staff conducting the searches.

2.7 Existing competence

The organization and its managers need to look at their existing competence. Discussions with leading staff members in terms of searches for information should reveal the advantages of a combined search project for the different partners. This discussion should combine all competencies. It will, at the same time, serve as a turntable for all information generated by the combined search, stimulating dialogue and cooperation among the different departments.

2.8 Specificity of information

Choudhury and Sampler (1993) state that there are many articles on how managers acquire and process information. They cite Zmud who notes that not much is understood on why the search for specific information is delegated. They argue that two dimensions of accessibility affect information: firstly, difficulty in physically accessing a source of information and, secondly, in acquiring information after physical access has been obtained. They also cite Daft and Lengel who argue that media use is determined through a rational theory of aligning the richness of the media with the uncertainty and equivocality of the task.

Managers need to keep self-acquisition versus delegation and regular monitoring versus focused search in mind. This means that a manager will have to choose to either access the information him/herself, or ask somebody else to acquire the information. This could affect the specificity of the information (Choudhury and Sampler 1993). By regular monitoring and focused searches, the manager will ensure specific information that will facilitate good decision making. Some information sources may be scanned on an ongoing basis.

Kirk (1996) states that one should verify by cross checking an additional author and citations. The obvious problem is that the information could be aimed specifically at an organizational problem; however the information may not be on a reliable site. Generally, reliable information is linked to another reliable source, and this can be verified.

Grassian (2000) argues that the specific information will be affected by the links on the page and whether these are relevant to the Web page. The expertise and credibility of the author

are also relevant. The following need to be interrogated:

- Is any bias evident?
- When was the information last updated?
- When was it produced?
- Are the other items (e.g. links) and graphics linked to the content (i.e. do they belong there)?

Lamb (2003) finds that organizational and institutional characteristics have an impact on the ways in which information resources are used and this impact on the specific information that is being accessed. Information providers and users normally fail to consider these characteristics when anticipating usage practices. Often the relevance of the information is ignored and managers are guided by compelling visions which link the use of digital information to economic survival, and which presume that information resources will only be used in particular ways.

2.9 Human knowledge

Some of the information might be human-specific knowledge – implying it is meaningful to only one individual. Human knowledge could be knowledge specific and expensive to transfer. This form of knowledge may be scientific and contextual, such as particular circumstances of time and place. Some people also do not know where to start searching and this impacts on their knowledge. It is better to start with engines such as Webfile or Teoma.com. Some of these sites supplement human knowledge, but charge a fee. Cass (1998) argues that it is important that any employee's knowledge should be captured for the organization. Feedback of this human knowledge should be conveyed to all relevant managers and other people.

Human knowledge is often guided by expectations that are likely to influence organizations when they construct roles for professionals who make decisions. Some human knowledge might contradict the expectations people have of this information. The idea, however, would be to get a good fit of the information between the manager's knowledge and the usability of online information. To access information selectively, users need to establish long-term relationships with trusted intermediaries. Kirk (1996) notes that human knowledge should help evaluate the information that is being created. Personal information such as the name and affiliation of the person should be in the article. Is the Web site an official site or is it a personal site? Orlikowski and Barley (2001) argue that human knowledge is impacted by the information available on the Internet.

2.10 Problem of the problem

Much of managers' searching for information can be characterized in terms of three activities, namely:

- describing some phenomenon that they need information on;
- articulating a theory that can be used in the search that will help solve the phenomenon; and
- testing the information to ensure that it will solve the phenomenon.

Some managers may argue that this is not the correct approach; however it works for most of them.

As a novice searcher one tends to focus primarily on the search method. One may struggle to acquire and master the arcane skills that make for good search design, high-quality

information collection and appropriate information analysis. As reviewers of information, managers or designated persons should therefore evaluate information using the guidelines proposed in this article. Using retrieved information, the ability to package information appropriately is an equally important but difficult skill to acquire. Staff and managers should realize the importance of the phases mentioned above.

2.11 Quality of information

Buckland (1991) argues that there is an ambiguity that should be clarified in terms of the information supplied as stated in the section on strategies of information seeking. All the dimensions cited in the previous section should be satisfied if successful accessing of information is to be achieved. Information technology can increase the specificity of the information – especially the time factor mentioned in this article. Kirk (1996) states that the quality of the Web site where the information is stored will normally determine if it contains quality information.

Klein (2002) argues that training may increase the awareness of the quality of information. She notes that there is a plethora of information freely available on any topic and that the quality of this information needs to be checked before it is accepted for any decision-making purpose. Quality control needs to be applied, especially in terms of editorial and peer review. She also notes that quality of information is a multi-dimensional concept that has been lacking in the past. She argues that people who do not have training in Web services are more inclined to trust information accessed. In addition, perceptions of the quality of Internet-based data on some specific topics are more favourable than perceptions of the quality of Internet-based information in general.

Howe (2001) notes that it is always important to evaluate the quality and presentation of information on the Internet. If the information is to be used with any confidence, it should be critically evaluated and validated. This means that the manager and his subordinates should be trained to develop evaluation skills. At the same time, it will help Web publishers to ensure that the information they publish is credible and authoritative. The problem is finding information that has already been evaluated.

Babbitt (1998) argues that in order to have quality information, the organization should perceive that the set of objects about which they theorize has quality and a perceived order. In other words, the message that is received should be what the sender intended it to be (the quality should be the same). Information and the quality of this information should be representative of a certain experience intended and the quality should not deviate. Nambisan (2003), on the other hand, states that information can be inter-disciplinary in nature and that people interpreting the information need to keep this in mind. The question is how to reshape contributions from other fields in order to be relevant to management.

Tillman (2003) notes that while using popular search engines, the value of description rather than that of evaluation is used, and the manager should always be mindful of this. Some clearing houses (e.g. Look_Smart) will help to eliminate this information 'chaos' but it might take a while for some guidelines to be formalized, and managers cannot wait that long. Consequently, many sites have been devised to evaluate Internet sites; these evaluations are frequently subjective or biased, and organizations should bear this in mind.

2.12 Relevancy of knowledge

The search tools on the Internet affect the relevancy of the knowledge. Tillman (2003) argues that these search tools can be measured in terms of the relevancy of human knowledge. The capacity to provide immediate feedback is a critical factor that should be kept in mind and

will help to keep the information relevant. Choudhury and Sampler (1993) argue that all information is an asset and that the relevancy of the information is bonded by uncertainty. Sometimes the manager scans information without knowing what he or she is looking for. For the information to be relevant, managers need to keep in mind that relevant information may also be specific, and it cannot be aggregated meaningfully (Choudhury and Sampler, 1993). Kirk (1996) argues that accuracy will determine if the information is relevant or not. Frequently, however, documents on the Internet do not even include a bibliography. The information may also not be current, and furthermore, people sometimes pay search engines to include their information.

2.13 Strategies

There are some building-block strategies for information that can be employed by managers, namely governance structures, the specificity of the information and the costs of obtaining this information. There are also many types of strategies that can be employed, such as self-monitoring, focused self-search, delegated monitoring and delegated self-search. Some of these should be done by the manager him/herself and by the employees.

Buckland (1991) notes some concerns that need to be taken into account when accessing information. These would obviously affect the strategy based on this information. Each individual has an own strategy and this needs to be kept in mind by managers when using subordinates to retrieve information. Access should be regarded as a unifying concept while designing the strategy and should be used in a specific way. Some aspects that need to be taken into account when designing information retrieval strategies are the following:

- A source needs to be identified;
- the source should be inspected;
- the price of the information for the users should be known;
- the cost of providing this should also be considered;
- the user should be able to understand it (cognitive access); and
- users should be able to accept it unreservedly (acceptability).

Babbitt (1998) posits that in order to study information, one also requires a paradigm based on some substance relative to other disciplines. Tillman (2003) supports this by noting that some items need to be kept in mind to ensure that information is relevant and taken seriously. These include a well-indexed title that most of the search engines can assess. The pages should not be too complicated or go beyond the capabilities of normal viewers or browsers. The target audience should also be reached easily, that is, managers should not struggle too hard to obtain the information.

2.14 Time and information

Information is time-specific if it must be captured at a specific point in time, otherwise it becomes less useful (Choudhury and Sampler 1993). These authors note that information is not time-specific in use if it decreases in value unless used very soon after it becomes available (e.g. a quote for a personal computer).

2.15 Trust and thrust

Kirk (1996) argues that in order to trust information on the WWW, managers need to keep in mind that:

- information is rarely neutral;
- it represents a certain point of view (it can be biased); and

- it frequently cannot be verified and therefore cannot be trusted.

Babitt (1998) states that in order to trust information, managers need a consistent lens through which to study it. For information to be trusted, they need variables against which to measure the systems of information, using a cognitive approach. He argues that most information theorists postulate that truth is a necessary requirement of information.

3 Conclusion

In this article it is argued that because of important epistemological differences between the fields of information and decision-making based on the collected information, much can be gained from greater interaction between them. It is also argued that information searches can benefit from organizational analysis of this retrieved information in detail, while decision-making can benefit even more by taking cognizance of the qualitative properties of information.

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