Intranets and Organizational Learning: Impact of Metadata Filters on Information Quality, User Satisfaction and Intention to Use

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Intranets and Organizational Learning:
Impact of Metadata Filters on Information Quality, User Satisfaction and Intention to Use

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Abstract

Intranet portals can facilitate organizational learning by enabling the sharing and retrieval of information from organizational repositories. However, Intranet portals are far from being perfect for facilitating organizational learning. Prior research has identified several user-interface issues which inhibit the use of Intranets for organizational learning purposes and has suggested new usability features in the Intranet portals with an aim towards improving them. Metadata filter is one such feature which can facilitate information search and retrieval by selectively controlling the number of metadata elements used to represent a digital object in an Intranet portal. By applying the DeLone and McLean IS Success model to Intranet portal incorporating such a metadata filter we intend to demonstrate that the use of metadata filter leads to higher levels of information quality, user satisfaction and intention to use, three important dimensions of information systems (IS) success.

Keywords: Organizational learning, Intranet, Metadata filter, information systems success

1. Introduction

The term Intranet describes intra-organizational networks that are based on Internet technology and are used for communicating and accessing information within an organization's boundaries. Intranet provides the organization an infrastructure for information acquisition, dissemination and sharing and acts as an individual user's gateway for different internal and external repositories of information. Increasingly, the Intranet is viewed as an essential tool for carrying out organizational learning (Duane and Finnegan 2000). However, there is a huge scope of improvement in the use of Intranets as an organizational learning tool. In particular, user interface related issues such as navigation and search strategies, and the use of intelligent interfaces and personal agents for user-specific customizations have been identified as some of the key technology issues that need to be addressed in order to promote Intranets for organizational learning (Jacko et al. 2002).

In this paper we investigate the role of metadata filter (Ji and Salvendy 2001) in addressing information/knowledge search and retrieval issues in an Intranet portal. Metadata or "data about data" is crucial for storing, searching, retrieving and representing digital information. While there could be many metadata elements used to represent a piece of information in the Intranet portal (15 or more metadata elements are included in
common metadata standards such as Dublin Core or IEEE Learning Objects Metadata),
the challenge is to establish a balance between providing enough context without causing
an information overload. The metadata filter considered in this study is expected to
selectively display different number of metadata elements to represent a digital object in
an Intranet portal (Ji and Salvendy 2002). The number of metadata elements displayed
will be based on users’ familiarity level with the digital object under consideration. Thus,
it will effectively personalize the Intranet portal for each user and facilitate their use in
accessing information and knowledge repositories, which are considered pre-requisites
for organizational learning.

Ji and Salvendy (2002) showed that an Intranet portal with a metadata filter increased
subjects’ efficiency and accuracy in identifying digital objects. Based on the results of
their experiment, one can possibly conclude that a metadata filter leads to an Intranet
portal with higher information quality (DeLone and McLean 1992); however, it is not
clear whether this also translates into higher user satisfaction and intention to use the
system. From an organization’s perspective, it is important that employees make regular
use of the information and knowledge repositories, as this can lead to better-informed
decisions, and a collaborative environment facilitating knowledge sharing and reuse.
Hence, features within the Intranet portal that increases use or intention to use are crucial
in strengthening the role of Intranet portals in organizational learning. Thus it is
important to investigate how a user-interface feature such as the metadata filter can
translate into higher levels of use.

We apply DeLone and McLean’s (1992; 2003) model of IS success to Intranet portals to
demonstrate that incorporation of the metadata filter is positively associated with user
satisfaction and intention to use the system. The rest of the paper is organized as follows:
the next section reviews the relevant literature on Intranets, organizational learning, the
proposed metadata filter and the DeLone and McLean model for IS Success. This is
followed by the research model and hypotheses and a discussion on potential
contributions of the study.

2. Literature Review

2.1 Intranets

The Intranet is an organization-wide internal network to enable users to find, use,
and share documents and Web pages. In some organizations, Intranets are used as the
primary way for communicating with employees, to disseminate work-related documents,
company news, collaborate on designs, access e-learning, etc. With the web browser as
the interface, the Intranet links together information systems across different functional
areas of the organization that would otherwise be incompatible due to differences in
technological platforms. Intranets use traditional Internet protocols, TCP/IP and HTTP to
transfer data. An Intranet portal is a gateway to information and knowledge repositories
within the organization. Different users can access different organizational repositories
though their personal portal window. Three main functions of Intranet portals within
organizations are – to provide links to all internal and external content providers, to
present an uniform access to all organizational information and knowledge repositories,
and to provide facilities and tools for information cataloging, collaborating and managing (Jacko et al. 2001). In this paper, we consider the Intranet portal as a gateway to several organizational repositories which manages content through proper cataloging of information.

2.2 Organizational Learning

The importance of organizational learning for the growth and evolution of organizations is widely acknowledged (Levitt and March 1988). Organizational learning can be, intended and designed, as well as unintended and evolutionary (Weick 1991; Miner 1990). Huber (1991) put forward a four-dimensional framework for designing and improving organizational learning related activities. These include knowledge acquisition – the process of obtaining knowledge; knowledge distribution – sharing of the information; information interpretation – giving one or more interpretations to the distributed information; and organizational memory – means for accumulating and storing the knowledge for future use. The dimension of organizational memory is considered central to the idea of organizational learning because the other three processes of knowledge acquisition, information distribution and interpretation depend on organizational memory.

Organizational memory can be thought of as a repository for knowledge acquired through experience and other means. Such repositories consist of the mind of individual employees, relationships between employees, paper and electronic databases of information, work processes and technologies and products or services offered (Cross and Baird 2000). In this study, our references to organizational memory imply electronic repositories for storing different kinds of digital information items, with the intranet portal as a gateway for accessing the information stored in these repositories.

Intranets hold a great potential for supporting organizational learning by being a powerful communication medium (Telleen 1998). Current applications of intranets for organizational learning primarily focus on encoded knowledge or explicit knowledge. However, Intranets with human-centered features for content management and search that can better support and facilitate organizational learning processes (Ji and Salvendy 2001). The incorporation a metadata filter in the Intranet portal is one such feature to improve user performance in identifying and retrieving information (Ji and Salvendy 2002) from organizational repositories.

2.3 Metadata Filters in Information Search and Retrieval

Digital objects are of little value without information about how they were collected, their purpose, formats, platforms for viewing and manipulation, restrictions on reproduction and reuse, along with other identification information, such as author or producer, title, subject, and abstract. Metadata is used to provide context to digital information and literally means “data about data”. It refers to the structured data about the object that can help in their management, storage, retrieval and representation. Metadata is crucial to searching because it can standardize the structure and content of indexing or cataloging information (Milstein and Feldman 1999). While metadata elements are essential for providing proper context to digital information, the primary concern faced by system designers is that of finding the fine balance between how much
meta-information is sufficient without loss of information representation quality, and avoiding information overload and crowding of the portal window. What makes the task more difficult is that on the one hand, for familiar information very few metadata elements are sufficient, however, for unknown information, users need more metadata elements. In this context, Ji and Salvendy (2001; 2002) proposed the use of a metadata filter under an Intranet portal to selectively control the number of metadata elements displayed based on some pre-defined selection criteria for easy information retrieval from repositories. For example, a user’s usage pattern and history can provide lot of information about the relationship between the user and the organizational information/knowledge repository which can be used to control the number of metadata elements displayed (Ji and Salvendy 2002).

The metadata filter considered in this study is based on the one proposed by Ji and Salvendy (2002). Most standard portal systems contain the four basic metadata elements – title, date, author and format (file type); while these metadata elements are sufficient for representing information that is well known to users, for unknown information, providing more metadata elements such as abstract (description), subject, etc. may enhance the identification process. Ji and Salvendy (2002) proposed a metadata filter, which calculated a user similarity rating for each user in a specific organizational repository. Whenever, new information is added in a specific organizational repository, the metadata filter would represent this information on the users personal portal space using different number of metadata elements depending on the similarity rating between the user and the repository from which the digital object originates. For high similarity ratings the number of metadata elements used will be few, whereas for low similarity rating the number of metadata elements used will be more.

In a laboratory experiment it was shown that the presence of the metadata filter improved the efficiency of information retrieval process (Ji and Salvendy 2002). This finding has important implications for IS researchers because the Intranet portal can be viewed as a tool for organizational learning and improved performance can result in user satisfaction and subsequently use or intention to use the system. Use or intention to use and user satisfaction are important dimensions of IS success which are closely related to each other (DeLone and McLean 1992; 2003). Thus, it is meaningful to investigate whether users using an Intranet portal with metadata filter actually perceive a more satisfying experience of their interaction with the system and report a higher intention to use such a system for carrying out their job.

2.4 DeLone and McLean Model for IS Success

We use the DeLone and McLean (1992) framework for IS success to derive the research model for our study. The model suggests that success can be measured in terms of six different but interrelated dimensions of success – information quality, system quality, use, user satisfaction, individual impact and organizational impact. System quality and information quality were expected to lead to user satisfaction and use, which in turn would cause individual and organizational impact. The model has been successfully applied in research investigating different aspects of IS adoption, implementation and use at individual and organizational level, leading DeLone and McLean to further enhance and extend it (DeLone and McLean 2003). In the revised
model service quality is incorporated as another dimension of IS success and it was also recognized that depending on the context intention to use might be a better measure of system success than actual use when actual use is difficult to measure directly, or is not voluntary. The two dimensions of individual and organizational impacts were merged into a single construct called net benefits, as benefits are more readily understood as positive outcomes while impacts could be both positive and negative.

3. Research Model

Although the model provides six dimensions for assessing success, it is appropriate to select the dimension(s) that are relevant to the specific context. Information quality is often measured in terms of accuracy, timeliness, completeness, relevance and consistency. It has already been shown by Ji and Salvendy (2002), that the incorporation of the metadata filter improved the efficiency of information seeking and retrieval processes. Thus, from a user’s standpoint, metadata filter will lead to better quality information. System quality and service quality are not relevant in the current context because service quality is more applicable for the measurement of overall success of the IS unit, whereas system quality is defined in terms of reliability, response time, ease of use, etc., which remain invariant with or without the presence of the metadata filter. From the organizational learning perspective, Intranet portals can capture the organizational memory to facilitate organizational learning. However, for this to happen, the Intranet portal should be put to regular use by employees for their work-related information requirements. Benefits from the system can accrue only through its use. Thus, the three dimensions of success that are considered in the current study are information quality, user satisfaction and intention to use.

3.1 Information Quality

This refers to the quality of the information generated by the system and has been defined and measured in terms of the degree to which the information produced has the attributes of accuracy, relevance, timeliness, reliability, usefulness, etc. (Ahituv 1980; DeLone and McLean 1992; 2003; Rai et al. 2002). Metadata elements are important for representing information and the metadata filter can improve this representation by differentiating between different digital information objects based on user-specific criteria such as level of familiarity with the digital object. Thus it is likely to result in
faster identification of the object and fewer numbers of errors in retrieving a particular object from an organizational repository as found by Ji and Salvendy (2002). Thus we hypothesize that the use of metadata filter in the intranet portal will improve the information quality by reducing the time to identify and by increasing the accuracy of the retrieved information.

**H1:** The use of metadata filter in the Intranet portal will result in higher information quality.

### 3.2 User Satisfaction

Many researchers have relied on user satisfaction as a measure of system success. User-satisfaction is expected to be a strong predictor of actual use and an important dimension of IS success (DeLone and McLean 2003). In the current context, we expect that users performing their information retrieval tasks with the metadata filter incorporated in the Intranet portal will be more satisfied with system because it will not only help them in speedier and more accurate retrieval, but also provide an uncluttered browser window thus reducing information overload. Thus, we hypothesize:

**H2:** The use of metadata filter in the Intranet portal will result in higher overall user satisfaction with the system.

It is believed that there is a causal relationship between information quality and user satisfaction, such that higher information quality leads to higher user satisfaction. This relationship has been empirically validated in a number of studies (e.g., Agarwal and Prasad 1997). While it is expected to hold in the case of Intranet portals as well, the presence of the metadata filter is likely to positively moderate the relationship. Thus it follows,

**H4a:** Information quality will be positively related to user satisfaction in the Intranet portal.

**H4b:** The presence of metadata filter will positively moderate the relationship between information quality and user satisfaction.

### 3.3 Intention to Use

Use or intention to use is an important dimension of system success (DeLone and McLean 1992; 2003) because it can ultimately lead to benefits being derived from the system. It is more appropriate to consider the intention to use where usage behavior is difficult to operationalize or measure, because of mandatory or voluntary, informed or uninformed use or when a system is still in a trial phase. Thus,

**H3:** The presence of metadata filter in the Intranet portal will result in higher intention to use the system.

DeLone and McLean’s (2003) updated model and prior empirical studies (D’Ambra and Rice 2001; Guimares and Igbaria 1997) contend that user satisfaction can positively affect the intention to use a system. Further, we expect that the presence of a metadata filter in the Intranet portal will result in higher user satisfaction, which in turn will lead to a higher intention to use the system. Thus,
**H5a:** User Satisfaction will be positively related to intention to use in the Intranet portal.

**H5b:** The metadata filter will positively moderate the relationship between user satisfaction and intention to use.

### 4. Discussion

This study is aimed at positioning Intranets as a tool for organizational learning, and on examining how the implementation of intelligent features such as the metadata filter can increase the effectiveness of Intranets in organizational learning. Thus, this study intends to serve two purposes – to validate and extend prior findings by assessing the impact of metadata filters on the search and retrieval of information from an electronic repository, and to provide support to DeLone and McLean’s model by investigating the effect of metadata filter on information quality, user satisfaction and intention to use. The study is motivated by the understanding that Intranet portals have a strong potential for enhancing organizational learning, and in turn organizational performance. Higher information quality, user satisfaction and intention to use will lead to overall success of the Intranet portal systems.

Ji and Salvendy (2002) show that metadata filters reduce the time taken to identify and retrieve information objects using the Intranet portal. We adapt and extend their work by hypothesizing that users using the metadata filter are also likely to report higher values of information quality, over all satisfaction with the system and intention to use. The proposed hypotheses can be validated in a laboratory setting involving control and treatment groups using Intranet portal without and with a metadata filter. We expect that the results of the experiment will confirm that the metadata filter indeed leads to higher values of information quality (H1), user satisfaction (H2) and the intention to use (H3) thus giving empirical validation to the DeLone and McLean model for IS success.

### 5. Conclusion

Organizational learning is an essential pre-requisite for the successful execution of various mission-critical tasks and Intranets are expected to contribute towards learning (Duane and Finnegan 2000). Our study intends to extend Ji and Salvendy’s (2002) work to show that the incorporation of a metadata filter can result in higher effectiveness of the Intranet portal by improving Information Quality, User Satisfaction and the Intention to Use. Thus, this study makes an important contribution in the area of organizational learning by demonstrating that the incorporation of user-friendly features in the Intranet portal systems result in higher satisfaction and intention to use the system, thereby enhancing their potential for impacting organizational leaning.

### References


Dublin Core Metadata Initiative, 2004, [http://dublincore.org/about/](http://dublincore.org/about/)


