

Information Seeking Behaviour of Electronic Records Management Systems (ERMS) Users

Implications for Records Management Practices

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This article considers whether the way RM professionals manage records in accordance with the ISO 15489 standard is consistent with the information seeking behaviour (ISB) of Electronic Records Management Systems (ERMS) users. The empirical research includes an investigation of the ISB of ERMS users and how various factors, such as training, individual information seeking styles, tasks, and time, affect the ISB. Forty ERMS users in four Australian government organisations – in the utility, town council, banking and finance industries – participated in the study. Qualitative research methods (interviews and protocol analysis) were used to develop a model of the ISB of ERMS users. An understanding of how ISO 15489 was implemented in the ERMSs of the organisations was obtained from interviews with the organisations' records managers. The findings reveal that there is a partial match between the ISB of ERMS users and how the organisations implemented the ISO 15489 standard to manage records in the ERMSs. Users rely heavily on using the metadata elements included in the ERMSs. They are mostly happy with their ability to find records in the ERMSs, but they encounter difficulties and frustration when performing some searches. These searches could be completed more efficiently and effectively if users had a better understanding of the classification scheme or thesaurus, but records managers do not generally make these tools available to the users.

Keywords: Electronic Records Management Systems (ERMS), information seeking behaviour, records management, ISO 15489, classification schemas, thesauri, information retrieval, information search

Records management (RM) professionals implement their RM programs by benchmarking in order to adhere to the RM principles and practices that are stated in the international standard, ISO 15489 *Information and Documentation – Records Management* (International Organization for Standardization 2002). Is this standard, designed to assist RM professionals in implementing RM programs for their organisations, also consistent with the information seeking behaviour (ISB) of Electronic Records Management Systems (ERMS) users? We consider it important to understand how and if the RM practices used by the RM profession to manage records adhering to the standard actually match the ISB of ERMS users. Or are RM professionals imposing on users a system that enables the professionals to do RM tasks, but prevents users from having a system they can register their work into and search and retrieve information from in order to perform their job functions and tasks? These questions provided the motivation for our research.

The primary research question in our study is: Are the ways in which records are managed in the ERMS consistent with the ISB patterns of users? To assist with answering this primary research question we developed three secondary questions:

1. How are records managed in the ERMS?
2. What is the information seeking behaviour of ERMS users?
3. How do training, individual information seeking styles (IISS), task, and time available to conduct a search affect the information seeking behaviour of ERMS users?

We approached the research by firstly investigating what the ISB pattern of ERMS users is. Then, we looked at how information is managed in the ERMS. The usage of RM principles and best practices to manage records in the ERMS was assumed.

Four Australian government organisations that have implemented RM principles and practices in their organisations were studied. We in-

investigated the ISB of ERMS users to find out the information seeking activities they engage in when they need to find information in the ERMS. We also present our findings on how the organisations have implemented each of the pillar RM principles and practices in the ISO standard in their organisation. We then discuss the ISB pattern of ERMS users that emerged. Finally, we address the primary research question in our study: are the ways RM professionals manage records in adherence with the ISO 15489 standard consistent with the ISB of ERMS users?

Definitions of ISB and ERMS are best addressed before moving further into the body of the article. Information seeking in this research focuses on the user who is actively involved in the information seeking process. ISB encompasses both information searching and information retrieval. Information seeking is a response to what the individual perceives as an immediate need. For the purposes of this article, the ERMS is defined as an automated records management system that enables organisations to manage both their paper and electronic records. The ERMS integrates with common office word processing, scanning, and e-mail management applications. It is an electronic tool that enables organisations to register, capture, use, search, retrieve, modify, maintain, dispose, and archive their corporate and business records. This is similar to how Johnston and Bowen (2005) cite the National Archives of Australia's (NAA) description of electronic document and records management systems (EDRMS), but in this case the ERMS excludes documents and focuses only on records: "The EDRMS includes the whole of documents, records, methods, procedures, tools, [meta]data [index terms], knowledge, means and persons with which an organisation operates and fulfils its requirements to preserve evidence of its activities, maintain its memory, and preserve its knowledge" (Johnston & Bowen 2005, 133).

Organisations implementing an ERMS as part of their RM program ensure that the ERMS is implemented in compliance with the ISO 15489 standard. The ISO 15489 standard outlines RM principles and provides guidelines to RM professionals on what constitutes good RM practices. It sketches the requisite tools and programs for implementing RM best practices, such as policies, procedures, classification schemes, retention schedules, training programs, etc. It also describes how organisations need to maintain the RM program once it has been implemented,

by monitoring and conducting audits on use of the RM program, which is increasingly automated using the (ERMS). For specifications on functional requirements for the management of electronic records in an ERMS, organisations can refer to the European *Model Requirements for the Management of Electronic Records* (MoReq) (Cornwell Management Consultants plc 2001) as well.

Background and Literature Review

The RM literature emphasizes such issues as how information should be managed, organised, classified, and implemented, and how long it should be retained. RM theory (Kennedy & Schauder 1998) and best practice standards (International Organization for Standardization 2002) provide guidelines for how organisations should manage their corporate memory and information assets. In order to address our research questions, we first needed to find out how information is managed in an ERMS. We reviewed ISO 15489 and identified the eight pillar records management principles presented in Table 1.

Pillar RM principles from ISO 15489

1. Records Management **policies** are written to outline that the ERMS is the corporate information repository. Policies also outline roles and responsibilities for RM.
 2. Records Management **procedures and standards** identify what is a record, what information is to be created and captured into the ERMS, and how information should be stored and managed in the ERMS.
 3. Recordkeeping **metadata standards** provide the contextual framework for records. Metadata, simply put, is data about data. McLeod and Hare describe metadata in a records management context as “data that describes, contextualizes and facilitates the management of record[s]” (2005, 34). Examples of record metadata properties include author, record title, date of creation, classification scheme terms, etc. Metadata standards specify the metadata elements that need to be captured for records stored in the ERMS. It also states what the mandatory and optional fields in the ERMS are, and provides a pick list in some fields to restrict metadata to be captured.
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4. Records are managed using a **corporate classification scheme**. The classification scheme enables information stored in the ERMS to be classified by business process or subject.
 5. A corporate **retention and disposition schedule** is implemented in the ERMS to sentence records stored in the ERMS.
 6. **Security permissions** are set on records to ensure access to authorised personnel and to protect records.
 7. **Training** is provided to users on records management practices as well as on how to use the ERMS. RM training includes records awareness-raising training and information on how the corporate classification scheme works.
 8. **Monitoring and auditing** of the record management practices and systems is performed to ensure that the RM strategies established are followed and that they meet the business requirements of the organisation.
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Table 1. Pillar Records Management Principles.

What is largely missing from the RM literature is a discussion of ERMS users, their preferences and their behaviours as they search for information or documents in the ERMS. One issue that has received recent attention is the influence of task complexity on ISB. Byström and Järvelin (2002; 1994) found that the more complex a task, the more workers will explore information sources outside their comfort zones to fulfill their information needs.

Some clues to how ERMS users might behave can be gleaned from early work about information seeking at work. The most widely celebrated study was conducted in the 1960's by Allen (1984) who examined how research scientists searched for information. Although his study predates modern information systems, Allen's observation that people tend to minimise the effort they expend to search for work-related information has influenced our understanding of how people search for information using electronic information resources such as online databases (Culnan 1984; 1985) or the Internet (Klobas 1995), and what brings them to use information systems (Davis 1989; Karahanna & Straub 1999). Culnan (1984; 1985) noted the importance of users' perceptions of how easily accessible information stored in electronic information resources is to them, not only in terms of the functional ease of

use of the ERMS, but also in terms of the intellectual accessibility or “understandability” of the way content is presented in the ERMS. Most research on the use of electronic sources of information to support work has confirmed that users seek a balance between the perceived usefulness or quality of the information they are hoping to find and the perceived accessibility of the system and the information it contains (Auster & Choo 1993; Klobas 1995).

While this research provides some indication of the factors that may influence office workers’ behaviour as they search for the documents and information they need to support their work, it tells us little about what they actually do. Information scientists have developed generic models of ISB from observing people at work in other environments. Of particular relevance to our work is the modelling conducted by Ellis (1989) and its further development by Meho and Tibbo (2003). Ellis was interested in designing an electronic information retrieval system for library information sources. Working with social scientists at his university, he identified six common activities in a search for the documents that might be indexed in a library system, as presented in Table 2.

Activity	Description
Starting	Identifying a key source to commence a search.
Browsing	Identifying relevant sources.
Differentiating	Using differences in the nature of the source materials to filter material.
Chaining	Following up references provided in an identified source
Monitoring	Maintaining awareness of developments in an area through regularly following particular sources.
Extracting	Working through material in relevant sources.

Table 2. Six common information seeking activities by social scientists (Ellis 1989).

Meho and Tibbo (2003) updated Ellis’s model in an international study. They confirmed the basic activities in Ellis’s model, but added four new activities: *accessing, networking, verifying* and *information mana-*

ging. They organised the full set of activities into four groups: *searching*, *processing*, *accessing* and *ending*. The activities in each group are summarised in Table 3.

Groupings of Information Seeking Activities	Specific Information Seeking Activities
Searching	starting, chaining, browsing, monitoring, differentiating, extracting, networking
Processing	chaining, extracting, differentiating, verifying, information managing, synthesizing, analyzing, writing
Accessing	decision making
Ending	

Table 3. Revised ISB model (Meho & Tibbo 2003).

In this study, we used these models and the techniques that Ellis developed in his research, as scaffolds for developing an understanding of the ISB of ERMS users. We were also interested in the effect of other aspects of the context in which searches are conducted. In particular, we expected training, individuals' preferences (their individual information seeking style, IISS), the task and the time available to influence users' search behaviour. Figure 1 illustrates the expected relationship between these variables and ISB.

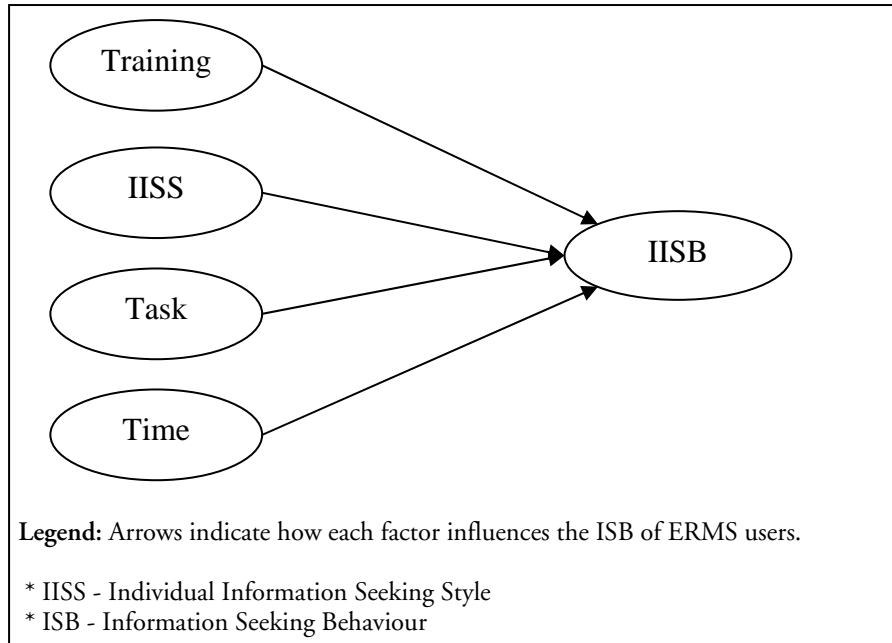


Figure 1. Hypothesized influences on the ISB of ERMS users.

Research Method

We used a combination of qualitative research methodologies and different research tools to gather data to answer our research questions. Our research method was to find out sequentially the answers to these questions: 1) What is the ISB of ERMS users? 2) What are the key factors that affect the ISB of ERMS users? 3) How are RM principles and practices applied to the management of information in the ERMS? and 4) Is the management of information in the ERMS that adheres to RM best practices consistent with the ISB of ERMS users? In this section, we describe the research method used and the way we conducted our data analysis.

Sample

In total, we studied four different organisations, using three different types of ERMS between them, and 40 users to identify the ISB of ERMS users. The research required participation by ERMS users. Hence, we

decided to target participants at middle management level. This group of ERMS users are professionals in their respective fields, and these middle managers rarely have a personal or administrative assistant assigned to them to seek information on their behalf, whilst senior management may have such a resource. This group of people are assigned tasks to prepare reports and provide ground level advice to management, and thus are target ERMS users.

Selection Criteria for Participating Organisations

We applied the following criteria when selecting the organisations sampled for participation in the research.

1. The organisation had an established records management program with the pillar RM best practices stated in ISO 15489 implemented. This refers to a RM program where there are: record-keeping policies and procedures in place; some form of classification exists, such as a taxonomy, thesaurus, or classification scheme to classify the organisation's corporate records; and a retention and disposal schedule that authorizes the disposal of records in accordance with legislation affecting the organisation.
2. At least one qualified or experienced records management staff member is appointed to manage the records management section.
3. The organisation had an ERMS. The ERMS must be managing electronic records with integration to the MS Office suite of applications or similar (e.g. MS Word, Excel, PowerPoint, Email Management, or equivalents like McIntosh or Lotus). It does not matter if the organisation is running a parallel system managing paper and electronic records.

Initial Contact with Selected Organisations

We made initial contact with each of the RM professionals either by telephone or by e-mail, to introduce them to the researchers and the research, and to find out if the organisation met the criteria to be included in the research. Once the organisation consented to participate in the research, we initiated a formal process for organising the interview sess-

ions. An e-mail was sent to the RM professionals requesting that they identify key ERMS users in their organisation, across various departments within the organisation, so that a cross section of staff from different professional backgrounds were identified for the study. When the RM professional completed the interview schedule, we reviewed the position description of the ERMS users identified in order to ensure that a cross-section of staff from different professions and business units were selected for participation.

Research Tools Used to Collect the Data

Identifying RM Practices – Case Study with RM Professionals

Using the pillar RM best practices stated in Table 1, we developed structured interview questions addressing how each of the pillar principles were being practiced in the organisation. We held interview sessions with the RM professionals in each of the four organisations to find out how they have implemented the pillar records management principles in their organisations. Before the interview sessions, we requested all four RM professionals to either e-mail or make available to us whilst onsite all documentation on RM their organisation had developed or referenced for its RM regime. This documentation included Retention and Disposition Schedules (RDS), classification schemes, thesauri, policies, procedures, guidelines, and training information about the ERMS. Screen dumps of the ERMS record registration and search screens were also requested to be made available onsite or via e-mail. Most of the requested information was received via e-mail in advance of the scheduled interview session with the RM professionals, and this greatly assisted with preparing for the interview sessions with each of them. The screen dumps of the ERMS provided an understanding of how the ERMS was configured for the organisation and provided an overview of the type of metadata being captured in the ERMS.

On the first day onsite, the RM professional provided a demonstration of the ERMS to us. The demos usually lasted 30 minutes. This was then followed by a one-hour interview scheduled with the RM professional. With the permission of the RM professionals, we recorded the interview sessions using a MP3 player.

Identifying the ISB of ERMS Users – Short Questionnaire, Interview Sessions, and Protocol Analysis with Participants

We asked participants to complete a short questionnaire, stating their name, the department they worked for, job title, bullet descriptions of their job functions, and what other information sources they used. We followed this with an interview session with the participant using semi-structured interview questions. Lastly, we used the “Think Aloud” Protocol Analysis research method (Ericsson & Simon 1993) where we asked participants to think aloud and show us how they conducted their most recently executed simple search, followed by how they conducted their most recent difficult search using the ERMS.

We visited each of the four organisations and gathered data on their premises. The interview sessions and the subsequent protocol analysis were conducted in the participant’s office in order to have access to the ERMS from their office computers.

It was possible to identify the ISB of ERMS users using the above methodology. By using the “Think Aloud” Protocol Analysis approach, it was possible to obtain an insight into users’ information seeking cognitive thought processes as they conducted the different types of searches. From an understanding of their ISBs, it was then possible to describe this behaviour. With the permission of the participants, we taped the interview sessions and later transcribed them. Notes were also taken during the course of the interviews and the protocol analysis observations.

Data Analysis

ISB of ERMS Users

To identify the ISB characteristics of the ERMS users, we used both the data gathered from the individual interview sessions with each participant and the protocol analysis for the difficult and simple searches. An initial ISB pattern was plotted using the data from the interview with each participant. Then, for the same participant, we plotted the ISB pattern from the protocol analysis for the simple search and a separate ISB pattern for the difficult search. A comparison was made of the three different ISB patterns for each participant, looking for similarities and differences. We performed these steps for all 40 participants; hence, in

total we developed 120 ISB pattern flow charts from the interview and protocol analysis data.

The ISB pattern from the interview data provided a representation of the participant's ISB characteristics, identifying all the different ISB characteristics the participant would engage with when seeking information in the ERMS. We found that the data from the protocol analysis reflected the ISBs described by the users in their interview sessions; the protocol analysis demonstrated a subset of the behaviours described in the interviews. The data from the protocol analysis was limited to the user's most recent simple or difficult search experience. This in turn skewed the ISB of users to the specific information they were seeking when they conducted their last simple or difficult search. For example, if the simple search was to look for a document with a specific "Record Number" and the record number was known at the time, then a meta-data search was conducted. Hence, we decided to use the ISB patterns plotted using the interview data to develop the individual information seeking behaviour (IISB) for each user, and then we aggregated these IISBs to form the aggregated ISB pattern for each organisation. We then aggregated the four ISB patterns plotted for each organisation, to derive a single final aggregated model of the ISB of ERMS users as presented in Figure 2.

RM Practices

We used the pillar RM principles and practices from ISO 15489 as presented in Table 1, and developed interview questions for the RM professionals to find out what RM practices they used to manage records in the ERMS. We then developed a matrix that compared all the eight pillar RM principles and practices stated in ISO 15489 to the practices used to manage records in the ERMS as they were presented in the interview sessions with the RM professionals.

Table 4 presents a condensed version of the matrix, using the first of the eight pillar RM principles, RM policies, as an example. The second column lists the type of questions that were developed to address how the RM policies have been implemented in the organisations. The next four columns present the responses from each of the four organisations. This method was continued in order to find out how the remaining se-

ven pillar RM principles were implemented and practiced in the organisations by the records managers.

What are the pillar RM principles & practices stated in ISO15489?	Interview questions for records managers	Organisations			
		Org. A	Org. B	Org. C	Org. D
Records Management policies are written to outline the aim and objectives of the records management principles and practices that need to be adopted in the organisation. It sets the rules on how records need to be managed and specifies the roles and responsibilities of staff in the organisation. Most importantly, it states that records need to be captured into	1. Is there an IM/RM policy in the organisation?	Yes	Yes	Yes	Yes
	2. What is the IM/RM policy of the organisation?	All organisations had RM policies, which were made available.			
	3. Is it endorsed and supported by senior management?	Yes	Yes	Yes	Yes
	4. Does the policy state that the ERMS is the corporate information repository for the organisation?	Yes	Yes	Yes	Yes
	5. How is the policy implemented in the organisation?	Training	Training	Training	Training

the corporate information repository, which is the ERMS.	6. How do you perceive the usage of the ERMS in the organization?	Good	Good, as indicated by the Audits.	Moderate. Improving	Good
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Table 4. The practices used to manage records in the ERMS in compliance with RM principles.

Matching ISB with RM Practices

Having the answers to what the ISB of ERMS users is and how records are managed in the ERMSs, we then proceeded to answer the primary research question: are the ways in which corporate documents and records are managed in the ERMS consistent with the ISB patterns of users? We developed another matrix, see Table 5, listing the eight pillar RM principles stated in Table 1 on the vertical axis and the ISB characteristics on the horizontal axis. We ticked the columns where RM practices matched ISB characteristics.

Information Seeking Behaviour Characteristics

Practices used to manage records by the four organisations.	Stage 1: Starting search	Stage 2: Formulate Search Strategy			
		Meta-data search using Boolean logic	Navigating tree structure of classification scheme	Both metadata & navigation	Retrieve search from Short-cuts
Records Management policies are written to outline that the ERMS is the corporate information repository. Policies also outline roles and responsibilities for RM.	✓	-	-	-	-

Table 5. Extract from matrix for coding ISB and RM practices.

Findings

The Information Seeking Behaviour (ISB) of ERMS Users

ERMS users performed a sequence of information seeking activities from the time they started a search to when they ended it. We grouped the activities into seven processes: starting the search; formulating search strategy; executing the search; processing and evaluating results; accessing results; decision making about search results; and finally ending the search.

Figure 2 presents the ISB model. It provides a process view of the activities users perform when seeking information in an ERMS. The information seeking activities are grouped into seven sequential broad ISB processes. Comprehensive descriptions of each of the ISB activities performed by users is stated in the flowchart in the sequences in which they occur.

1 Start Search

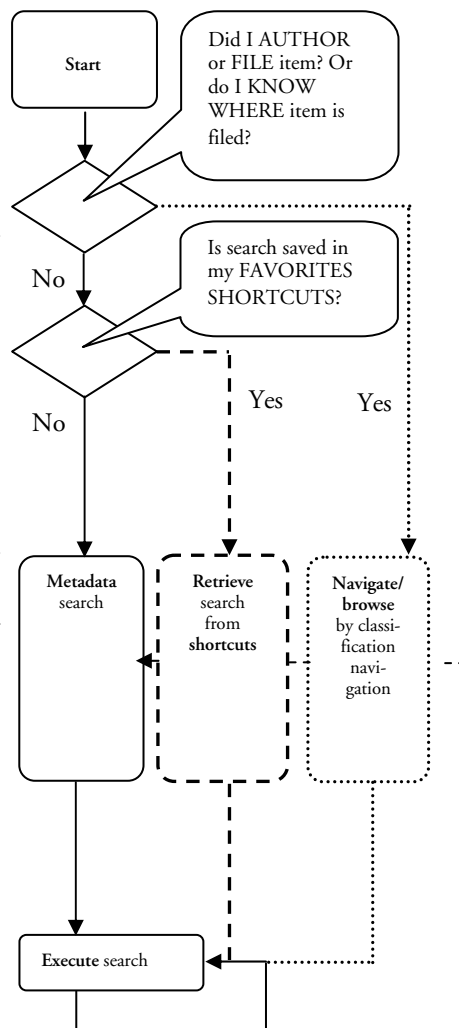
a ERMS users search the system for the following reasons: 1) They have a task to do and require information from the ERMS to complete the task; 2) They need to action a task by responding to action items via the ERM workflow; or 3) They require information in the ERMS as reference materials or to recollect what was communicated or performed previously on the same or similar subject matter. Hence, when STARTING a search, there is an AWARENESS of what ERMS users are searching for. They are aware of metadata associated with the search. Users make their decision on what search strategy to employ based on whether they AUTHORED or FILED the item, or KNOW WHERE the item is stored in the ERMS. If users AUTHORED, FILED or are AWARE where the items is filed they tend to NAVIGATE to the folder or item. Users also consider if they have conducted the search previously and if they have SAVED these searches into their FAVORITES SHORTCUTS.

2 Formulate Search Strategy

b ERMS users can formulate more than one search strategy. ERMS users exhibit 3 methods of formulating a search strategy: 1) If they have not conducted the search previously, they will use a METADATA search based on knowledge of what they are looking for, using the search engine. The choice of metadata fields to search by varies depending on what information is being searched for and the level of AWARENESS the user has of the information being searched for. Using the CONTENT SEARCH is the last option used. If users have saved the search criteria before, they will either 2) RETRIEVE the search from their SHORTCUT; or 3) RECALL where the document is filed and NAVIGATE/BROWSE through the CLASSIFICATION SCHEMA.

3 Execute Search

c EXECUTE search based on search strategy.



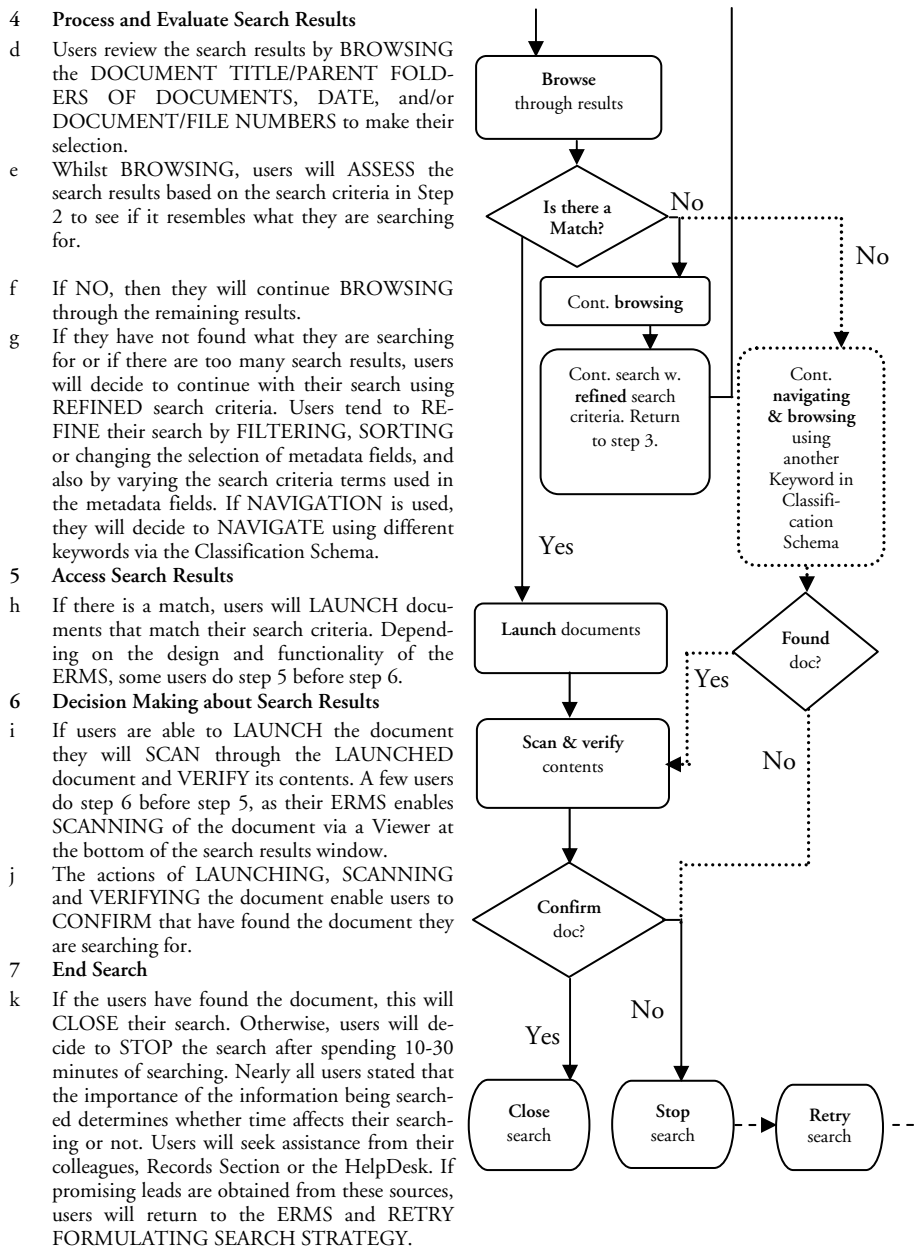


Figure 2. Information seeking behaviour of ERMS users.

In the following, we describe our observations of the ISB of ERMS users in each stage of their information seeking process as outlined in Figure 2.

Stage 1: Start Search

When starting a search in the ERMS, users had an awareness of:

- what information was being sought (this is later described as “task information awareness”);
- whether the information was authored by the user conducting the search; and
- whether a search shortcut had been created by the user and could be retrieved for the current search.

Stage 2: Formulate Search Strategy

The users exhibited three methods of formulating a search strategy. In almost all cases, if they had not conducted the search previously, they would use a metadata search based on their knowledge of what they were looking for, using the search engine provided by the ERMS. The decision of which metadata fields to search by depended on a number of factors, which we discuss later in this article. If the user had previously conducted the search, they might use a saved shortcut to retrieve the search or, if they remembered where the record was filed and the design facility was available to them, they might navigate or browse through folders using the classification scheme or tree structure that was implemented in the ERMS. Shortcuts included saved searches, recent edits, and items stored using the favorites functionality in the ERMS. It was at this stage of the ISB that the IISS of the user came into play. The IISS reflected the user’s preferred method for searching. Thus, we observed users who preferred to navigate the folder tree structure to find records, seek records by searching via metadata fields on the search screen, or search using preferred metadata fields, such as document title, author or date.

Stage 3: Execute Search

This was the act of executing the search formulated in Stage 2 by hitting the enter button on the keyboard.

Stage 4: Process and Evaluate Search Results

At this stage, the users browsed through the search results and assessed them to ascertain if the information they sought had been found. They refined their search criteria either to reduce the number of search results to a manageable few or to better focus on finding the required records. Common sub-activities were:

- Sorting search results to display information in a preferred order. Most frequently users sorted by date created, author, document title, or by chronological or alphabetical order.
- Filtering search results by using relevant metadata fields to refine the search results to a meaningful set to work with or to browse through. Users most often filtered by record type and date created.
- Navigating down the classification scheme folder structure using, where it was available, a hierarchical (tree) view to identify the sought record or information.

Stage 5: Access Search Results

Users accessed search results to confirm that they had found the record they were seeking. Their access could be limited by the security settings in the ERMS. They used launching to open items that matched the search criteria.

Stage 6: Decision Making About Search Results

The users scanned the opened record to verify that the contents matched the search criteria and to confirm that the record was the one being sought.

Stage 7: End Search

If the required record had been found, the search was closed. This could also be the case if the record could not be found. A search might be stopped when users did not find information quickly in the ERMS but expected to find it from another source. After having either stopped or closed the search, users would retry the search if there were promising

leads from sources where the users sought help in order to improve the search strategy. They would retry the search by returning to the stage where the search strategy was formulated.

Other Factors Impacting the ISB of ERMS Users

We hypothesized how the four factors training, IISS, task, and time would affect the ISB of ERMS users, as presented in Figure 1. We present these findings in this section. Our findings proved these hypotheses, but additionally revealed that training also influences IISS and task influences time.

The Effect of Training on ISB

Table 6 presents and explains each of the search methods that are available to users given the design of the ERMS in the organisations studied.

Search Methods	Explanation
1. Metadata search using Boolean logic	Searching using the search window in the ERMS for terms in the metadata fields of the record by using Boolean logic terms like “AND” or “OR”. An example would be “performance appraisals AND Joe Bloggs”. The words “performance appraisal” would be part of the title metadata field and “Joe Bloggs” the author metadata field of the record.
2. Navigating tree structure of classification scheme	Navigating or browsing the tree-view folder structure of the classification scheme presented in the ERMS.
3. Both metadata & navigation	A combination of the search methods 1 and 2 explained above.
4. Retrieve search from shortcuts	Retrieving search from the shortcut functionality available in the ERMS. These include retrieving searches from the recently accessed or saved searches folders and retrieving records stored in a favourites folder for quick access.

5. Metadata search using terms in the classification scheme	<p>Refers to searching using metadata fields such as “classification” and typing in terms from the classification scheme.</p> <p>Examples of first level terms in the classification scheme are Personnel, Financial Management, and Legal Services. Examples of second level terms are planning, reviewing, advice, and compliance.</p>
6. Using terms in the thesaurus	<p>Searching using terms in the classification scheme that are listed in the thesaurus. The thesaurus can be either uploaded into the thesaurus functionality in the ERMS, or uploaded into a software that integrates with the ERMS. In either of these installations, it is possible to search for records classified against the terms in the thesaurus. If the thesaurus is not integrated in the ERMS, it will not be possible to perform the aforementioned search.</p>
7. Sorting search results	<p>Refers to the act of using the sorting function in the ERMS to sort the search results presented after a search by preferred metadata field, such as author, title, date, or record number.</p>
8. View related documents/containers	<p>When the search results are displayed, it is possible to highlight a specific record and find out which records or containers (folders) are related to the record. This function enables users to identify and browse related or similar records relevant to their search that are held in other containers.</p>
9. Refining the search using Boolean logic or by varying metadata	<p>Refining the existing search using either Boolean logic terms like “AND” or “OR” to expand or narrow the search results. Alternatively, refining the existing search by changing the search terms.</p>

Table 6. Explanation of the search methods available to users in the ERMS.

Figure 3 summarizes the relationship between the training provided and the search methods that were used by the study participants.

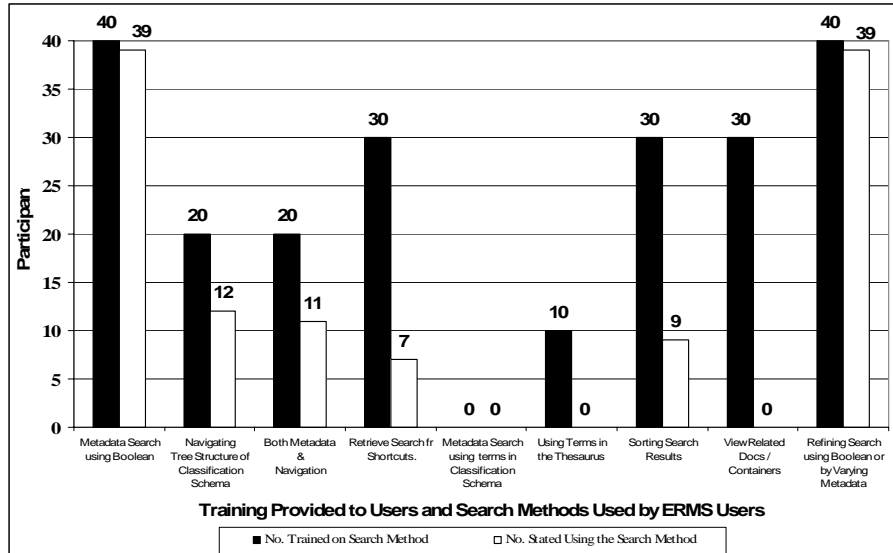


Figure 3. Search methods used in relation to training received.

Figure 3 reflects an aggregation of what training was provided to users and what search methods users stated in the interviews that they used. The x-axis lists all the different search methods available to users in the ERMS. Each of these search methods are explained in Table 6.

We make the following observations from the findings presented in Figure 3. The organisations provided training on some aspects of searching and not on others. Users tended to use the techniques they were taught. One organisation only provided training on two search methods and users in this organisation only used these methods. No user employed a search technique they were not trained in using. Three organisations provided training on how to view related documents or folders but none of the users used this function. Some search techniques were observed to be more popular than others. Ninety-eight percent (98%) formulated their search and refined their search using metadata fields.

Reviewing the training program of the four organisations and also the interview data of the RM professionals, we observed that none of the organisations provided training on how to search using the metadata associated with the first or second level terms in the classification scheme or using the thesaurus functionality embedded in the ERMS. Organisation C's thesaurus was uploaded using a third party thesaurus application and not integrated into the ERMS. Hence, users cannot search by browsing through the thesaurus and click on terms in the thesaurus to view records classified against the thesaurus terms. Training was provided to all organisation C's participants on how to search the thesaurus, so users would know how to request new folder titles from the Records Section. However, training was not provided on how to consult the thesaurus application and type in these thesaurus terms in the classification metadata fields of the ERMS to search for records classified against these terms.

Training programs on different search methods thus appear to play an important role in enabling users to effectively search and retrieve information stored in the ERMS. Providing focused training on the search skills that are most relevant to the type of tasks users are likely to perform frequently would enable users to adopt these search methods as part of their IISS.

The Effect of IISS on ISB

We describe the Individual Information Seeking Style (IISS) of users as the personal information seeking style that individual users already possess for information seeking. An IISS could be developed through working with other information systems, having worked with ERMSs in previous jobs, or using search engines such as Google to search the Internet or intranet.

Users did express some information seeking preferences in the interviews. For example, eight participants (20%) said they would create shortcuts to quickly access their frequently used records or documents. Some of the users who had used the "tree view" folder structure hierarchies in network drives or MS Windows Explorer preferred to "navigate" down the folders in the ERMS instead of seeking information

via metadata fields. These stated preferences were evident when users demonstrated searches to us.

We also noted that at times this direct relationship between IISS and ISB was moderated by both training and task. For example, we observed users who had a preferred IISS of “navigating” down the “tree” view folder structure of the ERMS also seeking information by using metadata fields when they were not able to find information using their preferred method. The ERMS training provided them with the skills of seeking information via metadata fields, and the task they had to perform forced them to use a non-preferred search method in order to find the required information, thereby moderating their ISB. The moderating influence that training has on IISS suggests that it is possible to improve the search and retrieval skills of ERMS users by providing appropriate ERMS training programs.

The Effect of Task on ISB

Previous research on theories of information seeking behaviour by Carol Kuhlthau, Gloria Leckie, T. D. Wilson, and Katriina Byström (Fisher, Erdelez & McKechnie 2006), indicate that “task” and/or “information need” drives the ISB of users. We observed this phenomenon in our research findings as well. The findings indicate that the ERMS users’ information seeking behaviour is driven either by a task that he/she has to complete or by a cognitive need for information to make decisions or to find out more about a topic.

Before proceeding to explain this finding, we would like to take a moment to define the terms “task” and “task information awareness” (TIA) as used in the research. We define task as a work related activity that the user needs to perform and complete by seeking and acquiring information. Examples of tasks are the need to:

- action an invoice,
- write minutes of a meeting,
- write reports on specific subject matters,
- conduct an analysis of past policies on a subject matter and develop new polices or revise existing policies, and
- conduct searches for information on behalf of colleagues or supervisors.

TIA, on the other hand, refers to the bits of specific information pertaining to the overall work tasks that the user or his/her colleagues know about and that aids the completion of the task. As an example, the task could be to approve an invoice from a supplier. The TIA the user could have to complete this task is perhaps only the specific invoice number to be approved. With this TIA, the user would be able to conduct a search in the ERMS using the metadata field “invoice number” and retrieve the invoice from the supplier and thus be able to complete the task. Alternatively, the user’s TIA could be only the name of the supplier of the invoice to be approved. With this TIA, the user could decide to conduct a metadata search using the supplier’s name or, if the user knows where supplier folders are filed in the ERMS, he/she may prefer to navigate to the specific supplier’s folder and retrieve the information.

Examples of the types of information that we observed that users were seeking from the ERMS to complete their tasks included searching for information that:

- they have authored in the course of their work and which they had filed into the ERMS themselves;
- their colleagues have authored and filed into the EDRMS;
- they need to share with their immediate business unit or colleagues and which has been registered into the ERMS by them or others;
- they need to either action, respond, review, or look at to complete their task; and/or
- information that contains historical data.

Observations from the protocol analysis suggest that the task directly influences the ISB. The level of TIA that users have of the task they need to complete greatly influences them when they seek information in the ERMS, thus making TIA a subset of task. For example, if users are aware that the information they need was created on a specific date, or who the author is, or where it was filed, they use this information to decide how to formulate their search strategies. That is, this knowledge influences whether they use a metadata search to find the information, navigate to the folder, retrieve the search from their favourites, or use their recently

accessed records shortcuts. It also helps them to later “Process and Evaluate the Search Results” by refining, filtering, or sorting their search results.

The Effect of Time on ISB

We hypothesized that time directly affects the ISB of ERMS users. While time did have an effect, it was weaker than we expected, and moderated by task. Twenty-eight users (70%) said that they did not apply a time limit when searching the ERMS. The remaining 12 (30%) said that they did not consciously time themselves when searching for information. They estimated that they spend between 2 to 30 minutes before deciding to stop the search.

All 40 users were aware that the ERMS is not the only source for information and that not all their colleagues store information in the ERMS. Thus, if they are not able to find the information they are seeking, they stop the search. They may then search other applications, approach a colleague directly, or seek clarifying information.

Implementation of Pillar RM Principles and Practices

We report our findings on how each of the organisations had implemented the pillar RM principles and practices, along with our findings on users’ ISB patterns in the ERMS.

Policies

The organisations have implemented RM policies that are endorsed by senior management in their organisations. The policies outline that records created and received by the organisation will be managed using the ERMS according to records management practices and legislative requirements that the organisation needs to adhere to. The policies have been implemented in the organisation by communicating them to relevant staff through campaigns during the launch of the policies or as part of the RM induction programs to new staff. This documentation is also published on the corporate intranets. In general, the RM professionals reported that they perceived that the ERMS is embraced positively by the organisation; however, there is resistance from some users.

Procedures and Standards

All the organisations have comprehensive RM procedures and guidelines developed and implemented as part of the RM programme. This documentation was promoted and communicated to all staff via road shows when it was initially implemented, and subsequently through induction programmes for all new starters. All organisations provide RM induction training in addition to training on the ERMS. As part of the RM induction, staff are trained on what is a record, and made aware of their responsibilities to save records and that e-mail records need to be captured into the ERMS. In organisation B, an analysis was conducted prior to ERMS implementation identifying what information in each business unit is a record, and as such needs to be captured into the ERMS. Staff in the other organisations were trained in how to identify records and register them in the ERMS.

After reviewing the RM documentation and the induction materials, we concluded that users are provided with awareness and understanding of what is a record and of their responsibility to save records into the ERMS. There is also awareness in all organisations that, apart from the ERMS which is the corporate information repository, there are other information management (IM) systems implemented for capturing records and non-records. Both organisations B and D have developed document-titling standards and communicated these to staff during induction programmes. However, when we review the interview and protocol analysis data it is clear that these standards are not followed consistently by all staff. About 43% of the users stated that their experience of information seeking in the ERMS is that it is difficult primarily owing to poor document titling by their colleagues or the Records Section.

Metadata

Metadata are implemented in all the ERMS implementations. In organisation B, to use the metadata is the only method available to users when searching and retrieving information. The design of the ERMS does not provide a folder structure view of how information is organised, so users in organisation B cannot navigate down a tree-view folder structure.

All the organisations have designed their ERMS using multiple record types so that appropriate metadata for the specific record type can be

captured into the ERMS. The implementation of this design assists users in searching for and retrieving specific records by limiting their search to a record type, then using a combination of metadata fields for the record type to conduct their searches. For example, when registering “contracts”, users are required to complete metadata on the contract number, date created, supplier details, etc. When searching for the record type “contracts”, these metadata fields can be used in combination to find the specific contract.

In Table 7, users’ preferred metadata fields when seeking information from the ERMS are listed and ranked. The data from the interview session with users were used to compile this ranking. The responses were to the interview question “What is your preferred way of searching for information in the ERMS?” Users could list a number of preferred metadata fields in their response. A tick was made in the metadata field each time it was stated as a preferred field. An aggregation of all the ticks for each metadata field was performed to derive the total for each organisation, as shown in columns three to six. An aggregation of the responses for all four organisations is presented in column seven. The last column presents a percentage figure derived from column seven.

The three most preferred and frequently used metadata fields for searching are the Title (68%), the Document or Application Type (30%), and the Author (18%).

Ranking by frequently used metadata fields	Metadata fields frequently searched	Organisations					
		A	B	C	D	Total	%
1	Title word	10	9	0	8	27	68
2	Document/ application type	10	0	2	0	12	30
3	Author	0	0	7	0	7	18
4	Record type	0	5	0	0	5	13
5	Object ID/ record or document no.	1	1	2	1	5	13
6	Date	0	0	5	0	5	13
7	File number	0	0	4	0	4	10
8	Contact	0	3	0	0	3	8
9	Treasurer's number	0	0	2	0	2	5
10	Any word	0	0	0	2	2	5
11	Typist	0	0	1	0	1	3

Table 7. ERMS users' preferred and frequently searched metadata fields.

When search results are displayed, users frequently browse the following metadata elements: Title of the Record (98%), Date (33%), and Author (10%). Given that the Title metadata is a key element in the search and retrieval of ERMS records, it is essential that the data entry into this field is as accurate and meaningful as possible.

Classification Scheme / Thesaurus

All four organisations have implemented functional classification schemes and thesauri based on the Keyword AAA (Accuracy, Accessibility, and Accountability; KAAA) or the Keyword for Councils (KFC) schemes. Three of the four organisations have implemented the KAAA thesaurus developed in 1995 by the State Records Office of New South Wales (NSW). The KAAA is a keyword thesaurus of general terms based on the keyword classification method. It covers administrative terminology common to most government organisations and “is constructed to reflect an organisation’s business functions and activities as they are documented by records” (Robinson & Knight n.d.).

KAAA and KFC use a structured hierarchy of keywords, activity, and subject descriptions: keywords are allocated to describe broad business functions; activity descriptors describe business activities; and subject descriptors are used to describe subjects or topics that connect related business transactions (State Records New South Wales n.d.). One organisation implemented the KFC, an adaptation from KAAA for local government councils. Similar to the KAAA, the KFC is a thesaurus designed for use in classifying, titling and indexing all council records in all technological environments (State Records New South Wales n.d.).

The functional KAAA thesaurus is uploaded using the thesaurus modules of the ERMSs in two of these organisations. In the remaining two organisations, the thesaurus is uploaded using third party software. In one of these instances, the thesaurus is integrated with the ERMS, and in the other it is not.

None of the RM professionals in the four organisations consider the training of users on the use of the classification scheme as an information retrieval tool to be a requirement, as they had the following perceptions:

1. the classification scheme is a RM tool to group records for destruction, something that users are not interested in knowing about,
2. users only want to know the file number into which they should be filing their information and are not interested in gaining an understanding of the classification scheme,

3. users only search using the metadata fields, not the classification scheme, and
4. users are aware of the Free Text part of the classification scheme, and these are the terms they are likely to use when searching.

Figure 4 explains the search tools users and RM professionals have at their disposal for information seeking in the ERMS. It shows how users only have one search and retrieval tool made available to them, namely metadata. In comparison, RM professionals have both metadata and the classification scheme as search and retrieval tools.

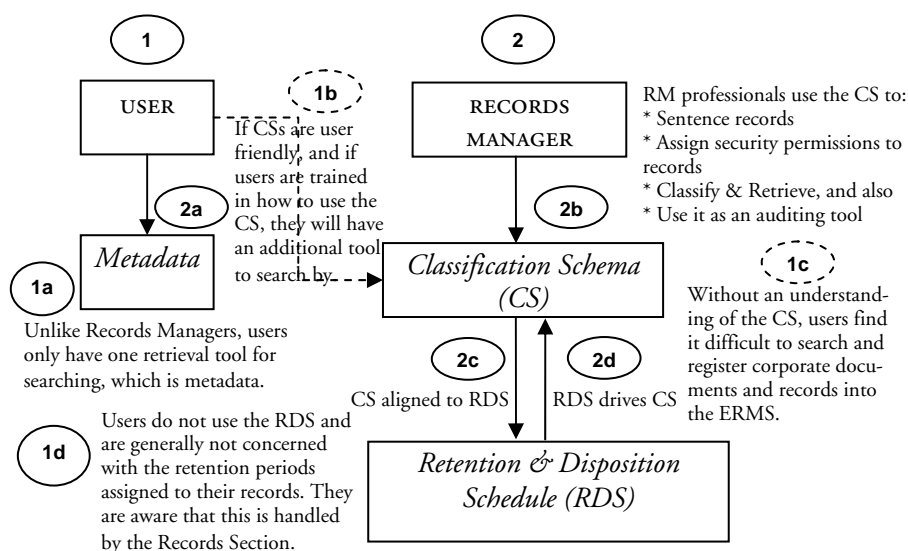


Figure 4. Usage of search and retrieval tools available to users and RM professionals.

The classification scheme is not perceived as a tool which, as stated in section 4.2.2 of ISO 15489-2 (International Organization for Standardization 2002), organises and groups like information, links interdisciplinary records so as to enable sharing of information within the organisation, and provides improved access, retrieval, and use of records in the organisation. Exon, in her RMAA conference paper and article from

1997, points out that the “major purpose of thesaurus has always been as an aid to efficient retrieval” (Exon 1997, 19). Hence, although the thesaurus and classification scheme are implemented in the ERMS in compliance with RM principles and practices, training on how to use it is not provided to users in three of the four organisations. Thus, users did not know how to work with and use these retrieval tools for their information search and retrieval in the ERMS.

Organisation C provided training on the classification scheme to users, but users still found it hard to comprehend the logic used to classify information. The following quotes from users in organisation C verify their views and work experience using the KAAA classification scheme in the ERMS.

Cumbersome, unclear to the novice, complex when it could be much simpler. Secretary & Records Focal Point

I kind of, I don't know, I neither like it nor dislike it in the sense of it's a Classification system [...] I don't find it intuitive but I guess I've grown to accept that it must have some sort of logic. (Director Human Resources)

I mean it's Keyword AAA, which I don't know if it's one of the great classification schemes that are around, but it makes sense I think to the person that put it together. Sometimes it doesn't really make sense to me. (Director Information Manager)

“Look, I can understand the logic, I guess it's different to how we used to file things, and there are occasions where putting stuff on particular files doesn't seem logical in terms of how the structure's been arrived at. And also there are situations where stuff doesn't quite fit and you're almost, you try and find terms that are close to what you think is the right term, and you put stuff there. And again, you know, there is the concern that you know, it's fine today probably fine in a week, but in 12 months time if you had to find the same document, you may struggle. Look, again, you can always search on the document title if you can remember a particular term that related to the document, but if you knew not a lot, and you

know, sometimes you might, I think you might struggle to find particular things. (Director Information Manager)

I know there might be an article in the Western Australian about the prices of land increasing, this sort of thing, do you put it under “valuer general”?, do you put it under “land tax”?, do you put it under “advice”?, do you put it under “media”? [...] And you know, depending on what perspective you’re approaching it from I might look at it from a different perspective as someone else but we could possibly both be right, you know what I mean. (Team Leader, Land Tax)

The thesaurus module is integrated in the ERMS for three of these organisations. However, these organisations did not make users aware of either the thesaurus or the classification scheme, and none of the organisations promoted the classification scheme as a search and retrieval tool. Thus, users relied heavily on using metadata for searching, but this is not always the most effective or efficient search method. It explains why 68% of users relied on searching by the document or record title metadata field. It also explains users’ frustration when documents and records are not titled meaningfully, as verified by their quotes.

Probably searching for other people’s documents. [...] Because they don’t Title them correctly. [...] So brief Titles, abbreviations, just Titles that I wouldn’t call something, so I find it hard to find others. (Training Consultant)

That people haven’t put the right information in the Title Word. That they’ve used acronyms, or they’ve used their interpretation of what it is. They haven’t, they’ve omitted information. A good example of that is that I’ve just recently been given access to search for some of these electronic, the scanning of bills that I get, but they haven’t put the account number in the search, so I can’t search on the account number. So it’s usually the information in which it was recorded was poorly, inconsistent. (Manager Communications, Systems & Technology)

People aren't consistent in their titling, nor are they thoughtful in their titling. I don't believe that they give it enough thought and don't use the principle that in ten years time when this is no longer current nor relevant in the workplace will somebody be able to find this by the Title that I've described. (Administration Officer, Risk & Compliance)

As Figure 4 indicates, classification schemes are aligned to the RDS and thus the retention periods of records actually drive how records are classified and thus drive the classification scheme. This results in classification schemes that fragment the grouping of records by retention periods using the activity descriptors in KAAA and KFC, instead of grouping like records together. This, in turn, makes the classification scheme less intuitive in relation to how users work and think of retrieval using the ERMS, thus making the classification scheme the least preferred information seeking characteristic of ERMS users:

the classification structure is probably one of the last ways I'd use of finding things. As I said before you know, going to that File Plan, tree structure to find things, I'd use that after I've tried a couple of other different ways of finding things. (Director Human Resources)

We observed that users need to be made aware of the classification scheme not only for searching information in the ERMS but also for registering information into the ERMS. During the registration process, users need to decide where they are going to file their records, and if they lack an understanding of the classification scheme, they may misclassify records. This leads to difficulties or failures when seeking information in the ERMS, not to mention premature destruction of records. About 28% of the users commented that the most difficult metadata field for them to complete is the "File Number" field. These users asked if this metadata field could be removed from the registration screen. Three users admitted to taking the easy option of registering records into the ERMS by classifying their records into the recently used folders displayed in the pick list of their registration window. This again indicates the ambiguity and lack of understanding of how the classification scheme in

the organisation works. The quotes from users verify their difficulty in identifying where to file the record.

I don't [search for folders or containers] any more, I just use the ones that I use all the time. (Manager Communications, Systems & Technology)

A participant highlighted that his colleagues do not file information pertaining to a particular government agency by what business function had been performed for the agency. Instead, they picked one business function and filed all information regarding the agency into the one single folder in the ERMS.

Analysts are not, if they do work for a particular agency, they are not filing it by whether it's ADVICE agency, whether it's BUDGET agency, whether it's CAPITAL WORKS, OPERATING EXPENSES agency? They tend to just pick one area, maybe ADVICE and put even the BUDGET there? (Secretary & Records Focal Point)

Look, the most difficult is not so much searching for information, it's again going back to just trying to find the right file to put it on. Sometimes it's relatively easy, other times, as I say, it can be painful and difficult, and again there has been more than one occasion where there's just, it just doesn't quite fit the File Plan, and you say, oh, no, this is, you've got to add something or something, or you'll put it somewhere where it looks like it will fit, knowing full well if you don't find this thing in the future, you're going to struggle, but you just sort of hope it's never, you never have to come back to it. (Director Information Management)

Retention and Disposition Schedule

All the organisations have a corporate RDS developed, approved and implemented in the ERMS to sentence records stored in the ERMS. The retention periods are assigned at a folder level when new folders are created and this retention period is cascaded to all the contents filed within the electronic folder.

Thirty-eight users stated that they are not interested in the retention periods for records when seeking information in the ERMS. They have been informed, and are satisfied with that knowledge, that retention periods are applied to records and they will be consulted prior to the destruction of a record by the Records Section. Two of the 40 users stated that the retention period is important to them as they handle sensitive information that needs to be retained for a longer period of time, and also because they usually search for historical information and need assurance that the information will be retained for a long time. These two users stated that they checked the retention periods assigned to some records whilst seeking information in the ERMS.

Security

All the organisations have comprehensive security models implemented in the ERMS that ensure that only authorised personnel access information. Information can only be deleted by the Records Section and not by general personnel. Apart from organisation B, the rest of the organisations do not have their ERMS security model documented.

The users are aware that there are security settings implemented in the ERMS to ensure that access is provided only to authorised personnel in the organisation and within business units. They have a general understanding that they have access to information stored in the ERMS that belongs to their immediate business units and projects or committees with which they are involved. We observed that users have little understanding of the details of security settings using “caveats”, record or document types implemented in the ERMS.

Training

All the organisations provided RM and ERMS training to their users during the implementation of the ERMS or employee induction programs. All the ERMS training provided to the participants was face-to-face hands-on training sessions in classroom style settings, with users having access to individual PCs. The training lasted two to five hours. The training programs covered a range of topics: configuring the ERMS, registering documents via check-in/check-out functions, work flow processes, searching, and working generally with the ERMS. None of the four orga-

nisations provided training on the use of the classification scheme implemented in the ERMS for searching and retrieving information from the ERMS.

See Figure 3 on the types of ERMS training provided to users and the section titled “The Effect of Training on ISB”.

Monitoring and Auditing

The organisations have monitoring and auditing processes in place to check on the quality of the data being entered into the ERMS. The Records Section performs these tasks. We were informed that any misclassification or inappropriate document titling is followed up with users for remediation. If users do not adhere to the remediation actions, it is escalated to the line managers for action. If this fails, in organisation D, the issue is flagged to the Audit Department for follow-up. Our findings indicate that more stringent monitoring and auditing is required to ensure data quality in the ERMSs.

Discussion

We observed that all four organisations have implemented the pillar RM principles listed in Table 1 and that their information management practices in the ERMS do adhere to records management principles and practices. The only variations of the RM principles between the organisations are in the implementation method in the types of policies, procedures, classification schemes, retention schedules, and training materials the organisations have developed. The organisations have implemented RM policies and procedures that are endorsed by senior management in their organisations. The RM documentation outlines that records created and received by the organisation are to be managed according to records management practices and the legislative requirements to which the organisation needs to adhere. The policies and procedures have been implemented in the organisation by communication to relevant staff, through campaigns during the launch or as part of the RM induction programs to new staff. The documentation is also published on the corporate intranets and in the ERMSs. Overall, the RM professionals perceived the ERMS implementation in their organisations to be successful. However,

as could be expected, there is resistance to the ERMS from some user groups.

Our assessment of how the RM principles and practices used to manage records in the ERMS interfaces with the ISB of ERMS users is presented next.

Stage 1: Starting Search

The RM policies set precedence in mandating the role and use of the ERMS in the organisation. If there are policies in place that state that the ERMS is the corporate repository for records, then users will use the ERMS to register their records and will know that the ERMS is the tool to use for seeking records. Thus, they start their information seeking in the ERMS. A number of users stated that they use the ERMS in their organisations because it is the mandated corporate repository for records. Likewise, the RM procedures, standards, and guidelines, provide the guiding principles for users on how to use the ERMS and what to expect from the RM infrastructure in the organisation. The training materials for RM and use of the ERMS form part of the RM procedures. This documentation also establishes the framework for the ISB of ERMS users.

Stage 2: Formulating Search Strategy

Three key RM principles affect this stage of the ISB pattern: 1) metadata standards; 2) classification scheme; and 3) training. The findings indicate that the most common and preferred ISB for ERMS users is searching using metadata elements. However, none of the four organisations studied have prepared a formal metadata standard documenting adherence to metadata standards such as the *NWS Recordkeeping Metadata Standard* (State Records New South Wales 2001), *Recordkeeping Metadata Standard for Commonwealth Agencies* (National Archives of Australia 1999), or the *Dublin Core Metadata Element Set* (International Organization for Standardization 2003). All four organisations have implemented metadata elements in the design of the ERMS and they use different record type attributes to capture relevant metadata for the specific record type. Our findings also indicate that users are not using the classification scheme to conduct their information seeking in the ERMS. All four organisations have developed and implemented the

KAAA or the KFC thesauri. It is interesting to discover that although records managers place importance on this tool when classifying information, its usefulness for searching and retrieving information is not passed on to users. None of the four organisations promoted or trained users to use their respective classification schemes to seek information in the ERMS in the way that they have done concerning the use of metadata fields. Only a couple of the 40 participants displayed any understanding of the classification scheme or used it when searching the ERMS. On the contrary, they preferred to use metadata elements to search. This could be because of lack of training and promotion on using the classification scheme to search.

Stage 3: Executing Search

This stage is not applicable to RM practices for the management of records.

Stage 4: Processing and Evaluating Search Results

The RM principles of metadata standards, classification schemes, and training impact this ISB pattern. Training on using the ERMS functionalities, such as filtering, sorting, and refining the search results, will enable users to process and evaluate their search results. Awareness training on the different record types and their associated metadata fields and classification schemes will enable users to perform better at this stage of their information seeking.

Stage 5: Accessing Search Results

Apart from the RM principles of training and security permissions, none of the other RM principles influence this ISB pattern. Security permissions are important as they determine what records users are authorised to view and/or make changes to. Having access to a record will enable users to launch it and then finalise decisions on the search results by scanning and verifying it. The lack of access will prevent the user from launching the record and thus render impossible the next stage, "Making Decisions about Search Results". Users were not asked about how they handled the information once they found it in the

ERMS, but it is theorised that users will either VIEW or PRINT the item, TAKE A COPY of it, or CHECK-OUT the item for editing.

Stage 6: Making Decisions about Search Results

The RM principles influencing this ISB pattern are: 1) training; 2) security permissions; and 3) monitoring and auditing. Training provides the skills to scan and verify the contents of the records and decide if it matches the information being sought. Security permissions enable users to access the documents and make decisions on search results. Without the right security permissions, users will not be able to access the information they are authorised to view, and consequently they will make poor decisions given their limited access to all the information that should be available to them. Monitoring and auditing RM practices ensure good content integrity in the ERMS, and thus enable users to make efficient decisions about their search results.

Stage 7: Ending Search

This ISB pattern is influenced by the following RM principles: 1) procedures and standards; 2) training; 3) security permissions; and 4) monitoring and auditing. RM policies and/or procedure documentation will provide an indication of what information should or should not be stored in the ERMS. If information that should be stored in the ERMS is in fact registered in the system, it will be possible to retrieve it and close the search rather than stopping the search. The delivery of training programs, implementation of security permissions, and regular monitoring and auditing by RM professionals will influence users' decision to either STOP or CLOSE their search.

Conclusion

Is the ISB of ERMS users consistent with the way information is managed according to RM principles and practices in ISO 15489?

The ERMS systems in these organisations have been designed to adhere to records management principles as stated in ISO 15489 in order to meet regulatory compliance and for evidentiary purposes. In theory, the RM best practices advocated in ISO 15489 are consistent with the ISB of ERMS users. ERMSs designed using this standard will provide

users with the option to search and retrieve information using both the metadata elements and the classification scheme. Having studied the ISB of ERMS users and having compared it to how records are managed in the ERMSs in our case study, we conclude that there is a *partial match* between the ISB of ERMS users and how the organisations have implemented the standard to manage records in the ERMSs. The RM tools that assist with search and retrieval are the metadata elements and the classification scheme.

In our case study, we found that ERMS users prefer to seek information using the metadata elements to retrieve records from the ERMSs. The metadata elements pertaining to “classification” terms is not used, nor preferred as a search option. Participants do not use the terms in the classification scheme, such as the keywords or activity descriptor metadata elements, when they conduct a metadata search to seek information from the ERMS. A handful of users (30%) reported navigating the tree-view folder structure using the classification scheme to seek information. The classification scheme presented in a thesaurus form via the thesaurus module is not being used as a retrieval tool in the ERMS either.

In view of how classification schemes are currently being used, which does not include an implementation as retrieval tools, we recommend that RM professionals consider, and perhaps implement, the strategies presented in the following paragraphs so as to overcome this potential limitation. Firstly, conduct in-depth training on how to use the current classification schemes, whether it is the KAAA or the KFC. This is achievable by devoting a segment in the RM induction programme to this topic. The training needs to ensure that users have a working understanding of the classification scheme and know how to use it successfully to register information in the ERMS. Promote the use of the classification scheme as a retrieval mechanism in the ERMS and train users in how to conduct searches using the classification scheme. We suggest that training includes an explanation of the structure behind the classification scheme: the scheme works by classification from the broader to the more specific topic and the classification is structured to classify by business function, then by business activity and then by the subject matter or topic, etc.

Given our finding that task drives users' ISB, we recommend highlighting to the users the specific keywords in the classification scheme that their business unit will be working with often. This will provide users with familiarity of the classification terms relevant to their tasks, thereby providing them with the confidence to search for information at broad subject levels by using terms in the classification scheme. Our findings also indicate that training modifies the IISS of ERMS users. Hence, incorporating training on the classification scheme would lead to users making use of the scheme as an information retrieval tool.

Secondly, modify the classification schemes used in the organisation, such as the KAAA or the KFC, so that they become "user friendly". We believe that this can be achieved by making the classification schemes intuitive to the users' way of thinking by removing any ambiguity from the classification scheme and aligning it to meet the users' work processes so that it is meaningful for them to work with in the ERMS. RM professionals may want to consider Exon's comment regarding the use of "activity descriptors" in these classification schemes: "the use of activity descriptors as the second level in all file titles places in an important position in the file title terms which are often not helpful for retrieval purposes and which add very little to the total effective meaning of the file title as a description of the content of the file" (Exon 1997, 20). In her article, Exon comments that the way classification schemes are structured with an "emphasis on functional analysis has been to the detriment of efficient retrieval" (Exon 1997, 19). We agree with Exon's comment on the need "to bring back into records management a commitment to precise retrieval at the level of the document" (Exon 1997, 21). She continues "and begin to emphasise post-coordinate retrieval" (Exon 1997, 21), but given that it has been ten years since Exon's article was published, the new design and search technologies available today in ERMSs make it irrelevant whether post-coordinate or pre-coordinate indexing is used in the ERMS. It is now possible to type in terms in the classification scheme, regardless of the citation order, by using Boolean logic search options and retrieve all records with the same classification. It is not the aim of this research to focus on the effectiveness of the KAAA or the KFC, but the findings reveal that users in the studied organisations have difficulties working with these tools.

Hence, we recommend that future research be conducted on how users retrieve records using these tools (see the section on “Future Research”).

Thirdly, develop a separate “user friendly classification scheme” to be implemented in the ERMS that is intuitive and aligned to the users’ work processes and thinking patterns. Then, RM professionals can align the “user friendly classification scheme” to the underlying RM classification schemes, such as the KAAA or the KFC, in order to work out the retention periods for records in the background. Alternatively, bypass the KAAA and the KFC and just use the RDS to sentence records. If the latter approach is taken, then the “user friendly classification scheme” has to be aligned to the RDS. Either way, the less user-friendly version of the RM classification scheme will be hidden from the users’ view in the same way the RDS is. In this way, the users will have a classification scheme that they can relate to and work with in order to register and retrieve information successfully in the ERMS.

Our observations of how users search and retrieve information from the ERMS also suggest that users would like to browse by navigating down a tree view folder structure if they already know where the record is filed or if they have filed the record themselves. Hence, when designing the ERMS it is important to provide users with the option to browse visually to retrieve records via the tree view folder structure as well as to search by using the metadata search in a “virtual database” design.

Future Research

Many of the findings of this research indicate that training is a key issue in improving the effectiveness of ERMSs for users. We suggest that future research examine training in more detail. Research that identifies users’ IISS prior to training and compares post-training search strategies with the preferences expressed as the IISS would help to confirm the role of training in the ISB of ERMS users. In particular, it would be interesting to understand if training on using classification schemes for searching the ERMS has any effect and, if not, why.

In general, further research on the value of the classification schemes and thesauri seems warranted, particularly given the predominance of metadata searching among ERMS users. Focused research on organisations that have implemented the KAAA and the KFC and the users’

experience of working with these RM tools is required to ascertain the value of these tools for classification and retrieval. Research on whether RM professionals are expecting too much from the classification scheme/thesaurus tool is worth embarking on as well. The KAAA and the KFC tools enable RM professionals to sentence, classify, assign accountability and security, and conduct audits of the RM program. Are these RM tasks preventing these tools from being good mechanisms for information search and retrieval for users?

A number of other user studies could be pursued. For example, why do some users fail to use ERMSs or use them only in the most cursory way, even when the RM principles, training plans, senior management support, qualified resources, and other factors believed to encourage system use are in place? Finally, our research did not directly study user satisfaction with ERMSs, but such research – particularly where it compares different ERMSs – could provide interesting insights into the quality of ERMSs and their acceptance among their users.

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References

- ALLEN, TIM J. (1984). *Managing the Flow of Technology: Technology Transfer and the Dissemination of Technological Information within the Rand Organization*. Cambridge, MA: MIT Press.
- AUSTER, ETHEL & CHUN WEI CHOO (1993). "Environmental Scanning by CEOs in Two Canadian Industries." *Journal of the American Society for Information Science* 44.4: 194-203.
- BYSTRÖM, KATRIINA (2002). "Information and Information Sources in Tasks of Varying Complexity." *Journal of the American Society for Information Science and Technology* 53.7: 581-591.
- BYSTRÖM, KATRIINA & KALERVO JÄRVELIN (1994). "Task Complexity Affects Information Seeking and Use." *Information Processing & Management* 31.2: 191-214.
- CORNWELL MANAGEMENT CONSULTANTS PLC (2001). *Model Requirements for the Management of Electronic Records*. Luxembourg & Bruxelles: Cornwell Management Consultants plc.
- CULNAN, MARY J. (1984). "The Dimensions of Accessibility of Online Information: Implications for Implementing Office Information Systems." *ACM Transactions on Office Communication Systems* 2.2: 141-150.
- CULNAN, MARY J. (1985). "The Dimensions of Perceived Accessibility to Information: Implications for the Delivery of Information Systems and Services." *Journal of the American Society for Information Science* 36.5: 302-308.
- DAVIS, FRED D. (1989). "Perceived Usefulness, Perceived Ease of Use, and User Acceptance of Information Technology." *MIS Quarterly* 13.3: 319-340.
- ELLIS, DAVID (1989). "A Behavioral Approach to Information Retrieval System Design." *Journal of Documentation* 45.3: 171-212.

ERICSSON, K. ANDERS & HERBERT A. SIMON (1993). *Protocol Analysis: Verbal Reports on Data*. Revised ed. Cambridge, MA: MIT Press.

EXON, MAGGIE (1997). "Contemporary Recordkeeping: The Records Management Thesaurus." *Informaa Quarterly* 13.4: 14-22.

FISHER, KAREN, E., SANDA ERDELEZ & LYNNE E. F. MCKECHNIE, EDS. (2006). *Theories of Information Behavior*. American Society of Information Science and Technology (ASIS&T). Medford, NJ: Information Today.

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION (2002). *ISO 15489-1 and 2: Information and Documentation – Records Management*. Geneva: International Organization for Standardization.

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION (2003). *ISO 15836: 2003(E) – Information and Documentation – The Dublin Core Metadata Element Set*. Geneva: International Organization for Standardization.

JOHNSTON, GARY P. & DAVID V. BOWEN (2005). "The Benefits of Electronic Records Management Systems: A General Review of Published and Some Unpublished Cases." *Records Management Journal* 15.3: 131-175.

KARAHANNA, ELENA & DETMAR W. STRAUB (1999). "The Psychological Origins of Perceived Usefulness and Ease-of-Use." *Information and Management* 35.4: 237-250.

KENNEDY, JAY & CHERRYL SCHAUDER (1998). *Records Management: A Guide to Corporate Record Keeping*. Melbourne: Longman.

KLOBAS, JANE E. (1995). "Beyond Information Quality: Fitness for Purpose and Electronic Information Resource Use." *Journal of Information Science* 21.2: 95-114.

MCLEOD, JULIE & CATHERINE HARE, EDS. (2005). *Managing Electronic Records*. London: Facet Publishing.

MEHO, LOKMAN I. & HELEN R. TIBBO (2003). "Modeling the Information-Seeking Behavior of Social Scientists: Ellis's Study Revisited." *Journal of the American Society for Information Science and Technology* 54.6: 570-587.

NATIONAL ARCHIVES OF AUSTRALIA (1999). *Recordkeeping Metadata Standard for Commonwealth Agencies*.
<<http://www.naa.gov.au/recordkeeping/control/rkms/summary.htm>> [2007-05-22]

ROBINSON, CATHERINE & JANET KNIGHT (n.d.). *Contemporary Recordkeeping – The Records Management Thesaurus – Response*.

<http://www.records.nsw.gov.au/recordkeeping/contemporary_recordkeeping_the_records_management_thesaurus_response_10470.asp> [2007-05-20]

STATE RECORDS NEW SOUTH WALES (2001). *NSW Recordkeeping Metadata Standard*. <<http://www.records.nsw.gov.au/publicsector/erk/metadata/metadata-std/nrkmstitle.htm>> [2007-05-20]

STATE RECORDS NEW SOUTH WALES (n.d.). *Keyword for Councils Overview*. <http://www.records.nsw.gov.au/recordkeeping/keyword_for_councils_430.asp> [2007-05-20]