Background Research Report

Muhan Chen
Team: Missing Link Consulting Group
Client: Information Assurance Office, Information and Technology Services
SI 501 – 001 & 003 (GSI: Yixin Zou)
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Summary of Client Mission

The Information Assurance (IA) Office is under Information and Technology Services (ITS), University of Michigan. It works with Security Unit Liaisons (SULs) across the university to coordinate and leverage university information assurance activities to meet unit requirements and support unit missions ("About Information Assurance", n.d.). Work of IA Office includes developing IT security strategies, mitigating IT security risks, securing the university's most sensitive information assets, providing guidance on IT security to the entire university community, etc.

Summary of Client Problem

One of the responsibilities of IA Office is to provide the university community with guidance they need to protect themselves and the university from cyber threats[1]. The relative education and awareness documents and materials are reusable and are stored in a set of Google docs that IA Office staff cycle through annually. As time goes, this archive of documents is becoming more unwieldy. IA Office would like to use U-M based tools to improve the materials management process in support of the development of their education and awareness program.

Questions to be answered

1. What is electronic document management systems (EDMS) and what features and advantages does it have?
2. What do studies on EDMS find in terms of the application of EDMS in the real world?
3. How can IA Office improve their document management workflow through EDMS in light of these studies?

Word Count: 1957 (cover page and bibliography excluded)

[1] Cited from background information from client.

Introduction to Electronic Document Management System

Document production and editing is the basis of work procedures of almost every entity. It used to be done in a completely paper-based manner. As the amount of information grows rapidly, number of new documents and new editions has also increased, which makes document management workflow more and more complicated and difficult to manage. At the same time, electronic devices are more and more prevalent in recent years, shifting a lot of work from paper-based to electronic. Thus, the documents are not only produced and transmitted electronically, but also edited and managed through electronic systems, which are commonly referred to as the electronic document management system (EDMS) (Pho & Tambo, 2014).

Electronic document management system (EDMS) is a computer-based system designed for document workflow, which includes a sequence of actions from production of new documents, through editing and updating, to the final publishing or invalidation (Pho & Tambo, 2014; Yatin et al., 2014). In this sense, document workflow is also referred to as "document lifecycle", which emphasize the entire procedure of document management (Volarcvic, Strasberger & Pacelet, 2000). Bae and Kim (2002) defined electronic document management by looking at the three words one by one. "Electronic" was defined as "use of modern information technology" and "document" was identified as a unit that contains a set of information to be comprehended. They considered "management" as integration of creation, storage, organization, transmission, retrieval, manipulation, update, and eventual disposition of documents, which is similar to the idea of document lifecycle. In view of the different procedures required in document management, Raynes (2002) pointed out that EDMS must have at least three functions – storage, adding documents and document identifying and retrieving – to operate.

EDMS has many advantages over traditional paper-based document management. Apart from the apparent advantage of saving paper (Ralph, 1995), EDMS can also facilitate workflow of organizations, which is the reason why Bae and Kim argued that it should be developed along with other commonly used approaches and technologies. In addition, EDMS brings broader inclusion that can facilitate collaboration and involvement of workers (Pho & Tambo, 2014).

While electronic document management is more efficient than paper-based management, it is not perfect and there are still problems that can be further improved. For example, the convenience of producing copies of electronic documents induces useless duplication of information (Adam, 2007, p. xxi). However, there is no "one-size-fits-all" design for EDMS that can be used universally (Pho & Tambo, 2014), which necessitate research on principles of document management as well as how those principles should be integrated into real-life workflow of different tasks.

Studies on Application of EDMS

Although there are different kinds of electronic document management systems, all EDMSs for all entities and sectors are trying to achieve a similar goal – making the process of document production, update, transmission and release more efficient and manageable. In other words, there is no essential differences in the underlying rationale of them. Thus, relative studies summarized in this report show a range of designs and results on different aspects of, but not distinct types of, application and outcome of EDMS.

In a case study carried out by Pho and Tambo (2014), the wind turbine company they looked at had a workflow-based mechanism of EDMS. Different people were involved in different stages of the lifecycle of a document. For instance, document preparer would respond to requests of new documents and began the production of new documents after the workflow was initiated. EDMS admins and IMS (Integrated Management System) reviewers are responsible for assigning numbers of new documents, formulating workflow and initiating new revisions. As the most important step of creating high-quality document, document review involved not only EDMS admins and IMS reviewers but also document coordinators and document releasers. The release and publication of documents completed by document releasers. It was argued that this process had fostered a better collaborative culture (Pho & Tambo, 2014) and improved transparency of document movement (Putivtseva, Zaitseva, Pusnaya, Kuz'micheva & Kaijuzhnaja, 2016).

Yatin et al. (2014) identified the outcome of implementation of EDMS in Malaysia Government into several aspects and tested the correlation between them. Those aspects included service quality (customers' perception of quality of a service), information quality (the value, usefulness, or relative importance of the output produced by an EDMS), and individual impact (the improvements in the performance and decision-making productivity of the recipients of information provided). They found that there was a strong correlation between service quality and information quality, meaning that the more abstract perception of "service" is positively related to the more specific "information" provided. It was also verified that information quality has a positive effect on individual impact. This demonstrates that as an output of EDMS, information of high quality can generate benefits for its recipients.

Because EDMS is a relatively new paradigm especially in developing countries, some countries and sectors have just completed or are still working on transition from traditional paper-based decument management to EDMS. Thus there are also studies that concentrate on implementation of the system, attitudes towards electronic tools, regulatory and legal frameworks. etc. For example, Hung, Tang, Chang and Ke (2008) concluded that perceived usefulness, perceived ease of use, training, compatibility, external influence and interpersonal influence all have effects on the workers' acceptance and intention to use EDMS. Mosweu, Bwalya and Mutshewa (2015) further argued that while most interviewed officers in at the Ministry of Trade and Industry in Botswana agreed that electronic system they are using is easy to learn and clear to understand, the absence of a policy and a legislative instrument impedes the implementation.

Potential Improvements of EDMS in IA Office's Workflow

Document control

The word "control" appears a lot in studies of EDMS. Pho and Tambo (2014) cited the description of document control in ISO9000 Quality Systems Handbook, pointing out that document control refers to control of all the stages in document lifecycle. Yatin et al. (2014) argued that high degree control is a key feature of paper-based document management systems, indicating that it is a general requirement instead of a specific function of EDMS. Raynes (2002) proposed version control and audit trail as one important function of EDMS, which emphasize the control and monitoring of any changes in documents

in the process of editing and reviewing. Thus, we can conclude that control of the document management process is essential to EDMS and we may lose control in a complicated document lifecycle that involves many different working groups.

The IA Office relies on Google docs for both document retrieval and document updating. They use an article tracking document to view what similar material was released in previous years around the same time[2]. Considering the complexity of document update and editing, it is possible that this article tracking document also be used to track any editing details. An alternative way is to use a more advanced tool that can provide editing details automatically. Some kind of graphic illustration such as flow chart would also help make the record clearer.

Information Quality and Broader Inclusion

Management of document cannot be separated from contents of documents. Thus, information quality is emphasized in some studies on information systems (Seddon, 1997; Grover et al., 2005; Petter, Delone & Mclean, 2008). EDMS can be designed in a way to facilitate information quality by enabling better collaboration and version control, but the system itself is not enough. According to our client, while they currently have enough materials in many different forms to use on an annual basis[3] and are doing good in managing relentless monthly and biweekly publication deadlines, they would like to engage in a system that support a more programmatic approach to add in new information such as new university standards, more timely information that are being discussed in the media. Another major concern is that members of the U-M community tend to pay more attention to information and advice from their local, departmental IT and IT security staff members than to centrally provided information[4]. In other words, they prefer customized information targeted to their unit's work and culture. In short, the repeatable release of information is easier to manage, while detailed work of updating and tailoring of information are more time-consuming and difficult to manage.

One feasible way to mitigate these concerns is including more stakeholders into EDMS, which correspond with the idea of "broader inclusion" mentioned before. This is not suggesting that we should put a lot of people into the document management team. Instead, while the core team of document management does not change, information and feedback from other teams and recipients of published documents can be integrated into the EDMS. Sources of information include expertise of other teams or departments, recipients' feedback, and so on. This can be related to one of the necessary functions that Raynes (2002) proposed – organization process, which means that EDMS should be able to arrange documents into related groups. Folders assigned to each group is one of the ways to achieve this. Our client told us that they "work with subject matter experts in the Information Assurance Office on all materials[5]", which indicates that different levels or sets of folders can be created and assigned to different working groups. For example, the documents can be divided into three groups: (a) articles to be published, (b) background information documents that are referred to as library of information, and (c) tracking documents used for workflow management. All of those experts and document producers may have access to (a) and (b), but they don't; need to check documents in (c) to because they only

[2] Cited from background information from client.
[3] Cited from background information from client.
[4] Cited from background information from client.
[5] Cited from background information from client.

need to know the deadline of articles they are responsible for. Workflow management people, on the other hand, may have access to (a) and (c), but documents in (b) are not shown to them. In this way, every group has less documents to deal with, which increases efficiency. At the same time, the possibility of accidentally making incorrect editing in unfamiliar documents is lowered.

Individual impact

The ultimate aim of improving EDMS is to deliver better outcome or service. In the case of IA Office, their ultimate goal is that the materials they share to the UM community can actually help them raise their information security level. No matter what kind of materials are prepared, what people are involved and what system is adopted, that target does not change. This can be summarized as the "individual impact" of their service. As mentioned before, information quality has a positive effect on individual impact, so the IA Office should figure out what aspect of quality would they improve to generate individual impacts. There are many possible ideas, but I propose that recipients' feedback would be the first one to consider. With the broader inclusion concept in mind, IA Office can design another folder in their EDMS to store feedbacks. This folder might be shared to everyone on the extended team as a guide for future improvements of document production and updating. In this way, customization of materials would be smoother and manageable.

Summary

EDMS is not a highly advanced system that requires high level of skills and intense training. On the contrary, it is quite common in many companies and government departments to an extent that many people don't realize that it can be further improved. To manage and monitor the whole lifecycle of documents better, users of EDMS should focus on document control and information quality through more advanced tools and broader inclusion. Furthermore, by valuing and carefully organizing feedbacks of information recipients, it is expected that output of EDMS would contribute to perceivable positive individual impacts.

Bibliography

About Information Assurance. (n.d.). Retrieved from https://safecomputing.umich.edu/about.

Adam, A. (2007). *Implementing electronic document and record management systems*. Auerbach Publications.

Bae, H., & Kim, Y. (2002). A document-process association model for workflow management. *Computers in Industry*, *47*(2), 139–154. doi: 10.1016/s0166-3615(01)00150-6

Springer. (2002). *Conceptual modeling for new information systems technologies Er 2001 workshops: Humacs, Daswis, Ecomo, and Dama, Yokohama, Japan, November 27-30, 2001: revised papers*. Berlin.

Hilty, L. M., Seifert, E. K., & Treibert René. (2005). *Information systems for sustainable development*. Hershey, PA: Idea Group Pub.

Hung, S.-Y., Tang, K.-Z., Chang, C.-M., & Ke, C.-D. (2009). User acceptance of intergovernmental services: An example of electronic document management system. *Government Information Quarterly*, *26*(2), 387–397. doi: 10.1016/j.giq.2008.07.003

Mosweu, O., Bwalya, K., & Mutshewa, A. (2016). Examining factors affecting the adoption and usage of document workflow management system (DWMS) using the UTAUT model. *Records Management Journal*, *26*(1), 38–67. doi: 10.1108/rmj-03-2015-0012

Petter, S., Delone, W., & Mclean, E. (2008). Measuring information systems success: models, dimensions, measures, and interrelationships. *European Journal of Information Systems*, *17*(3), 236–263. doi: 10.1057/ejis.2008.15

Pho, H. T., & Tambo, T. (2014). Integrated management systems and workflow-based electronic document management: An empirical study. *Journal of Industrial Engineering and Management*, *10*(1). doi: 10.3926/jiem.846

Putivtseva, N, Zaitseva, T, Pusnaya, O, Kuz'micheva, T & Kaijuzhnaja, E (2016). On the Use of Expert Evaluation Methods to Select the Electronic Document Management Syetem. Retrieved from http://docsdrive.com/pdfs/medwelljournals/jeasci/2016/733-737.pdf

Raynes, M. (2002). Document management: is the time now right? *Work Study*, *51*(6), 303–308. doi: 10.1108/00438020210441858

Volarcvic, M., Strasberger, V., & Pacelat, E. (2000). A philosophy of the electronic document management. *22n d Int. Conf. information Technology Interfaces/TI2000.* June 13-16, Pula, Croatia

Yatin, S. F. M., Ramli, A. A. M., Shuhaimi, H., Hashim, H., Dollah, W. A. K. W., Zaini, M. K., & Kadir, M. R. A. (2015). Electronic Document Management System: Malaysian Experience. *Australian Journal of Basic and Applied Sciences*, *9*(3), 82-89.