A Framework for Online Publishing in the University of Malaya

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Abstract

Scholarly communication activities such as journal publication and technical writings have been enhanced with the utilization of internet technology. Electronic publishing replaced the dissemination of knowledge findings through printed documents. The utilization of electronic publishing concept offers more advantages over the traditional way of communicating knowledge. This study identifies the online publishing technology and capabilities which could support the development of the online publishing system. This paper presents a proposed framework used for developing an Online Publishing in the University of Malaya (OPUM). This proposed framework for OPUM system provides a platform and mechanism for the scholarly communities in UM to communicate within its societies in terms of sharing, extending, exchanging, promoting, debating and distributing their findings, ideas and knowledge via an online publishing system.

1. Introduction

The rapid development and innovation in computer and information technology has significantly brought great changes on communication of knowledge and information. Here, we refer communication of knowledge and information as the process of searching, discovering, storing, and disseminating, distributing, sharing and exchange information into useful knowledge. The emergent technology has also shifted a new paradigm for information to be easily distributed and quickly accessed. The paradigm shift in information technology has contributed to the development of electronic publishing (Al-Hawamdeh and Hart, 2002).

Electronic publishing as a means of published information in electronically form, replaced the uses of paper with the new medium of storage such as floppy disk, CD ROM and DVD ROM. As quoted from Wills and Wills (1996), electronic publishing is defined as the using of computers in the process of capturing and disseminating knowledge and information. The usage of computers facilitates the communication of knowledge and information with attractive and interactive content features, reduced cost of publication, extended capabilities and flexibilities and high end medium.

When Internet and World Wide Web (WWW) technology hits the world in the early 1990s, the function and meaning of electronic publishing has transformed into Internet publishing. Nowadays, with the Internet flexibility and capabilities for easy to access, wide coverage and more creative content presentation, electronic publishing has significantly means online or Internet publishing. It is where news, articles and any kinds of material related to communication of knowledge and information can be easily access through online without limitation. The complex electronic communication system created by Internet has also changed the way academicians informally exchange information and changed the formal scholarly publications activities (Bailey, 1994).

Libraries and academicians recognized that the electronic publishing has the potential to support the increasing demand for access to information (Haigh, 1997). Electronic publishing has been also viewed as the new opportunities among the scholars or academicians to distribute and share knowledge effectively. The electronic medium adds more value for research, education and publication in different ways compared to conventional practices. Scholarly works

such as research findings, book writing, article, journal or any academic papers can be disseminated, collected and archived easily if electronic publishing is utilized. Publishers, librarians, university press, students, academicians and other authorities will obtain more advantages upon the new medium technology.

There are a few framework have been introduced in this electronic publishing such as *Open eBook Forum (2000)* and Goncalves et.al (2004). This paper will propose a new framework for online publishing system adapted from the two frameworks above. This framework is specifically design to encourage and support scholarly communication activities in University of Malaya (UM). The outcome of this study is hopefully can benefit the user's community of the system which are communities inside and outside of UM. It should also provides understanding on how the new media technology, electronic publishing could contribute to the creation of knowledge society and sustain the process of continuous learning and resource discovery in academic communities.

This paper is organized as follows. Section 2 presents concepts of electronic and online publishing in general; meanwhile Section 3 will introduce the Open eBook Forum framework. Section 4 and 5 will discuss the proposed framework for OPUM. The major section is Section 5 where the discussion of the extended framework; the extended 5S model and Open eBook Forum (2000). This framework is purposely developed for OPUM. Section 8 concludes the article with some insights into future work.

2. Electronic Publishing Concepts

Electronic publishing has been extensively replaced the conventional publication of books, articles, journal and other printed publications. Technological advances in computer and information technology has sustained the electronic publishing initiatives. Massive cross-publication range from entertainment contents to academic publication were disseminated in the form of electronic resources. Concurrent with Open e**B**ook Forum (2000) which define electronic publishing as the act of disseminating Literary Work in digital form; CDs, DVDs and websites are the widely used electronic medium nowadays for the purposes of disseminating, sharing and utilizing resources. Economics and speed of publication cycles, interesting content delivery concept with graphical user interface and hypertext capabilities and easy-to-access features were some of the reason.

The term 'electronic publishing' has been interpreted in different ways of definition. According to Al-Hawamdeh and Hart (2002), electronic publishing is relatively a new term and means different things to different people where it have been defined from a variety of perspectives. Findings from certain journal articles which discussed on subject related to electronic publishing indicated that different terms were used to

represent the newly kind of publication but similar in its context.

As cited from Chan (1999), electronic publishing are often referred as "electronic journal" or "electronic document", "electronic serial" and "electronic periodicals" in vice versa. Certain authors would also use the term 'electronic journal publishing', 'electronic scholarly publishing' or 'academic e-journal' when writing about publishing academic paper electronically in their journal articles.

In recent times, electronic publishing refers to the publication and dissemination of information or knowledge in and through electronic medium (e.g: CD-ROM, DVD-ROM and etc.). Despite of variety of meaning given to the term 'electronic publishing', one core principle holds to electronic publication is the distribution of digital documents (Berghel, 1999). Berghel's opinion has been strongly aligned with Kling and McRobb (1999), who highlighted that distribution medium, is the defining factor in electronic publishing. It is obviously seemed that in electronic publishing context, the concerned was on the necessity of technology that lay as the delivery medium. Graham (2001) quoted that electronic publishing is about publishing with the aid of technology. This is supported by Palmer *et al* (2000), which cited that the digital and technological revolution with rapid data transmission capabilities to multiple locations has provided the opportunities to publish information electronically. Aligned with previous opinions, Haigh (1997) has also emphasized on technology capabilities to support high speed transmission of information retrieval and accessing process in electronic publishing.

Here, computer is the supporting tool and technology when discussing about electronic publishing. Eysenbach (2000) defines electronic publishing in separate terms of 'electronic' which refers to information that is stored only in computers and 'publication' which means 'making public'. As nowadays, information is widely and easily disseminated to public with the aid of computer technology such as through CD-ROM or Internet (e.g: mailing list, websites, etc.).

When Internet and World Wide Web (WWW) technology hits the age in the early 1990s, electronic publishing has become relatively simple (Hovav and Gray, 2002). Internet is a powerful and revolutionary tool in electronic publishing (Waldman et.al, 2001). Internet had shifted the paces of changes in distributing electronic publication. Thus, it has redefined electronic publishing as Internet publishing; which refers to the using of Internet as the means of distributing publications (Zhao and Resh, 2001). Furthermore, Internet enhanced both publication process and access to sources that previously would have been unavailable (Herring, 2002). While Fletcher (1999) viewed publishing on the Internet means designing and building online information system.

Perspectives on electronic publishing concept have also penetrated the electronic commerce theory. Clarke (1997) and Vallieres (2001) approach electronic publishing as a defined subset of electronic commerce in digital goods and services that are intended for consumption by the human sense. Both digital goods and services are having similar issues and opportunities which are common to electronic and online publishing if electronic commerce is to be developed in this environment.

Concluding from some definitions outlined in the previous discussion, thus, information and computer technology have been identified as two main features in electronic publishing. Information or document is distributed primarily through media (CD-ROM, diskette or networked publishing), publication of e-books, electronic articles and the development of digital libraries. This information are including articles posted to discussion group on the net or disseminate via electronic mail, journal, conference papers, research findings, monograph, academic books and etc. While the computer technology plays as the medium of delivery, dissemination, accessing and indexing of electronic publication.

The different definitions discussed previously depict the similarities with the features of electronic publishing listed by Al-Hawamdeh and Hart (2002):

- Production and distribution of the document should be through electronic means
- Its purpose is to disseminate information
- It can be accessed and viewed through the computer or other electronic devices
- It may be interactive
- Digital media are used to receive, store and transmit information from computer to computer.

Based on the previous discussion, the concept of 'electronic publishing' used in this study is apparently refers to the fully-utilized Internet technology (i.e: WWW) to support the activities of main scholarly communication activities which is through journal articles publication in University of Malaya.

3. Framework for Electronic Scholarly Publishing

Range of framework has been developed and suggested for electronic publishing. One of the framework is proposed during Open eBook Forum (2000). The framework is composed of three parts: Reference Model, Glossary and Stakeholder Profiles.

(a) Reference Model
The reference model is the core of the framework and consists of:
- Domains - the electronic publishing world is composed of multiple Domains (commercial, non-profit, government, academic, etc)
- Elements - there are four types of Elements: Objects, Roles, Interactions and Authorities.

Objects flow between players of Roles in Interactions that are governed by Authorities.
- Perspectives - the Domains and the Elements within them can be viewed from three fundamental Perspectives (social, legal and technical)

(b) Glossary
A central component of any ontology is the glossary, a vocabulary of basic terms with a precise specification of what those terms mean. The glossary is composed of the most important terms used when discussing the electronic publishing ecology and has been thoroughly reviewed in an attempt to produce precisely defined terms. These are the terms that cause the greatest amount of confusion, particularly across perspectives. While the terms and their definitions have been extensively reviewed and are expected to support this framework and the standards developed for it, anyone seeking to use any of these terms in a contract should request legal advice.

(c) Stakeholder Profiles
Used to profiles the people and organizations with a financial, economic, or moral interest in the performance of one or more functions of the electronic publishing ecology. It is concerned with enumerating the stakeholders as a checklist for future requirements gathering activities. The previous framework clarified has some similarity with the one described by Ling et. al(1996). They had lined out four main components to facilitate electronic publishing: infrastructure, technology, production and distribution.
- Infrastructure - the basic facilities and installations needed for the functioning of the whole digital publishing of materials
- Technology - an appropriate electronic viewing technology is essential so that the electronic publication can be made easily available to the user.
- Production - take into account the reliability of digital storage, the search ability of indexed archives, the transmit ability of electronic files, and the cost efficiency of electronic duplication to produce electronic publication.
- Distribution - medium of distribution is depending on the type of format chosen and various other factors such as the size of the publication and the niche market, the level of product interactivity, speed, and the facilities available.

4. A Proposed Framework for OPUM

The development of OPUM prototype system is based on a proposed framework model depicted in Figure 1. This framework focused on the physical structure of the

developed system and the internal and external mechanisms which should support the sustainable of the OPUM system. Basically, the idea of this framework stands from the needs to focus on the process of encouraging online scholarly communication activities in an integrated academic and research environment. This proposed framework for OPUM system provides a platform and mechanism for the scholarly communities in UM to communicate within its societies in terms of sharing, extending, exchanging, promoting, debating and distributing their findings, ideas and knowledge via an online publishing system. It realizes an upright and interesting approach of communicating scholarly works such as journal articles, working papers, technical report, monograph and other related forms of publication works in a new integrated environment.
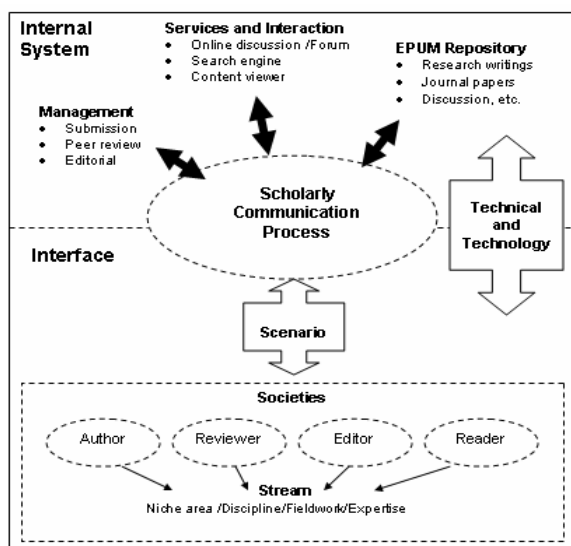

Fig 1 The proposed framework for OPUM

The establishment of the OPUM framework is based on the integration of 5S framework for digital libraries proposed by Goncalves et.al (2004) and framework for Electronic Publishing Ecology established by Open eBook Forum (2000). The 5S framework is intentionally to focus on the facilitation, development and usage for educational digital libraries initiatives. The terms in 5S framework refer to Streams, Structures, Spaces, Scenarios and Societies. While in Electronic Publishing ecology framework, it suggests three main parts of electronic publishing: references model, glossary and stakeholders profiles to help potential electronic publishing developers to define the requirements, standards and best practices clearly in the domain applications. In this study context, the proposed OPUM framework is to provide a visible system that support scholarly communication activities in UM while establishing its institutional repositories.

The framework for OPUM system suggests that OPUM system structure should consists of two main parts which are OPUM main interface and OPUM management system. Each part may support each other operational and functional processes required in online scholarly communication activities. The framework for OPUM also suggests the OPUM interface to act as an intermediary structure for both members and non members of academic communities to exchange a few words on intellectual and scientific practices and resources among themselves. It also represent the main gateway for users to access the surface structure of the OPUM system. The OPUM interface concerned with the ability to provide physical and interface structures which could lead to the encouragement of scholarly communication activities and processes within the scholarly or academic communities. It bridges the boundary between OPUM system and two main external mechanisms which are *societies* and *stream*. *Societies* and *stream* will have direct link with OPUM interface. The society's mechanism embodies the possible members in an academic communities and non member who have certain interest to involve in the scholarly communication activities. While that, *stream* refers to the different field of research, niche area, interests or knowledge expertise of the societies. The OPUM interface also holds the internal mechanisms which are *technical*, *service* and *interaction* functions. *Technical* refers to the facilitation of OPUM with suitable technology and physical structure which support its operational function. *Service* refers to the function and features should provided by OPUM system for the societies to achieve their objectives in scholarly communication activities and processes. This framework has also suggests that *interaction* mechanism should manipulates the capabilities of *technical* mechanism to encourage formal and informal communication within OPUM societies.

OPUM Management System facilitates the internal process of scholarly publication via an online publishing system. This second part of OPUM system is concerned with being able to provide different functions for which certain involved societies could use to manage publication process. This is represented by *scenario* mechanism. Apart from that, *OPUM repository* acts as a mechanism for the scholarly works to be stored in a systematic storage system and could be retrieved competently when needed.

5. Mechanisms of the Proposed Framework for OPUM

Further explanations for each mechanism of OPUM's framework are to be discussed in this section. The internal and external mechanisms for OPUM system are embedded in two main structures of OPUM which are OPUM Interface and OPUM Management System.

OPUM Interface

    (a)   Societies and Stream

In this suggested framework for OPUM system, the term '*societies'* represents the knowledge societies or communities. Based on Fox (1999), '*societies'* is referring to group of people or machine and Goncalves et. al (2004) views a broad definition for a society as a group of entities and relationships between them. However, to map with this study context, this framework suggests **societies** to be referred as an academic community with similar interest and enthusiasm in scholarly communication activities. This is inline with the opinion given by Tu and Corry (2002) where community seems to take place within social interaction about common interest. Each of them might having similar opportunities to learn, share, manipulate, expand, apply, issue and publicize their knowledge with each other in their community using a single platform (OPUM). Roles and level of authorities for each member of the **societies** might be different. They might have more than one role (Open eBook Forum, 2000). For OPUM system, four main members which form the **societies** have been identified. They are comprises of:

(i) *Readers* who are including researcher, students, lecturers and technologist who use the facilities to search and access published scholarly works. They communicate in both formal (e.g: submit article's review) and informal way (e.g: join forum discussion).

(ii) *Author* who contributes electronic scholarly publication such journal articles, technical reports, preprint publication and others.

(iii) *Editor* who facilitate and manage the flow of electronic or online publication process. They would also manage the administration part of OPUM system.

(iv) *Reviewer* who facilitates the peer review process before publication. An author may apply and accepted to be a reviewer based on several fulfillment criteria.

Societies play the important roles in ensuring the activities and processes in scholarly communication are realized and contributes resources to the domain. As an example, a reader might read an article written by an author which had been accepted by editors after being reviewed by particular reviewers. Without author(s), there will be insufficient resources for article contributions and no publication will be made.

Based on Goncalves et.al (2004), **streams** are sequence of elements of an arbitrary type (e.g: bits, characters, images and etc) which can model both static and dynamic content in a communication. It is basically refers to the flow of information or how information will be delivered in a system. Although, the term '*streams'* is suggested to represent the niche area of the **societies** interests in this framework. A member or non member of an academic society (or communities) might have different knowledge interests or expertise. For instance, scholars or academician in UM are formed from different academic background as UM is a university encompassed with different faculty of different disciplines. They might be educated with medical, engineering, architectural, IT and Computer, education, linguistic or business and economy streams. Thus, this framework suggests that OPUM system should concern with being able to facilitate users with different fields of knowledge and studies. This should be supported by applying the concept of categorizing type of articles according to different field of study in OPUM system. This feature could attract an enormous academic community in UM, who come from different group of knowledge, skill, experience and intellectual abilities to actively utilizing OPUM. To strength this point, recent work by Talja and Maula (2000) has found that different scholars have different behaviors towards search mechanism. Humanities scholars can discover ideas or findings outside their own specialties rather than nature scientists' scholars.

(b) Technical

Technical refers to the ability of OPUM system to perform as an online publishing system which required to be supported with state-to-art technology and physical structures. These are including server architectures, database management system and platform, server-side scripting components, Web site structures, service provider, information architecture, medium of document delivery and an established hardware and software support. The **technical** mechanism should support the operational, functional, implementation and maintenance aspects of OPUM system. **Technical** provides **societies** and its **streams** with facilities to communicate within its domain application using applicable technology infrastructures. **Technical** could also refer with the concern on quality, methodological soundness and originality of the online publication. This extends the scope of **technical** mechanism to content awareness towards the published materials in the aspects of process, format, management, information security, arrangement and representation. **Technical** mechanism is also to provide a

connection between the *societies* and OPUM system.

(c) Service and Interaction

Service refers to the ability to provide the *societies* and its *stream* with features and functions which could promotes scientific communication practices in UM through OPUM. Type of services implemented within an online publishing system depends on its business process model. Set of services which might be supported in an online publishing system based on Farsetti and Pasqui (2002) are including:

- document submission in digital format
- metadata creation and upgrading
- peer reviewing process
- metadata indexing, search and retrieval
- end-users registration, profiling and authentication
- alerting, news, discussion, forum and etc.

While Zhao and Resh (2001) have identified several functions that should be included in online publishing:

- provide online search of index databases via the Internet
- place soft copies of conventional journals on the Internet for authorized readers to use.
- convert conventional journals into hypermedia to allow cross-reference and retrieval.
- manage the editing process on the Internet and provide Internet-based distribution.

Services or functions could only being implemented if it is empowered with enabling and established technical support. Thus, only few services will be provided in OPUM due to limitation of technological support.

This framework also suggested the *interaction* term to represent the process of scholarly communication by using the provided services. *Interaction* plays a role as a medium to obtain and exchange information and knowledge between the *societies*. The significance of interaction and communication process in an academic and scientific environment can be viewed through recent works by several scholars. For instance, in a research environment, Lally (2001) stated that a research process involves interaction with other scholars throughout the process. Hars (2001) also emphasized on the role of communication where science depends upon communication between researchers and on access to the wealth of scientific knowledge generated by scientific community.

New types of interaction and communication channel have been introduced since the advent of Internet and World Wide Web technology. These efforts have been emerged with the requirements to communicate and response rapidly in an easiest and instantaneous way. Besides, computer-mediated communication (CMC) channel are less bounded by spatial and temporal constraints (Light and Rogers, 1999). It replaced the informal traditional communication practices such as through face to face conversion. The most popular computer-mediated communication channels supported by Internet technology are email, mailing list, newsgroups and Web-based discussion forum.

- *Email* is a transmission of text based messages between networked computers. It is one of the most basic resources on the Internet and common denominator of computer-mediated communication (Pallen, 1995).
- *Mailing list* is a system that allows people with common interest to send email to one address, whereupon their message is distributed to anyone who has subscribed to the list (Schweig et.al, 2001).
- *Newsgroups* are bulletin-board-like forums that individual can post to and that anyone can read later (Roberts, 1998).
- *Web-based Discussion Forum* provides a shared space on the Web or a common meeting place for participants to contribute information and resources. It is built based on participation and developed as people submit questions, provide answer and solution, present opinion, post documents for others to download and share links to other resources. It is where group of people works together to create a shared library of information (Akers, 1997).

Computer-mediated communication has been adopted by an increasing numbers of scholars during the last two decade of 20th century to support informal scholarly communication (Brown, 2001). Computer-mediated communication could enhance the process of interaction and communication within the academic communities or societies. For example, according to Anderson and Kanuka(1997), online forum is one of the methods that satisfy the need to reduce barriers in face-to-face communication in a cost effective manner. Therefore, instead of communicating scholarly works formally through document publications, computer-mediated communication support to enhance scholarly communication informally.

OPUM Management System

(a) Scenario

This framework suggests *scenario* mechanism to refer to sort of process and activities that happened when the societies used particular services via the supported technology infrastructure. *Scenario* identifies the processes involved in scholarly communication. *Scenario* play the role to ensure the objectives of scholarly communication is effectively achieved. Several scenarios or processes which are needed in an online publishing system are comprises of:

- materials submission process
- management process
- peer review process
- editorial and publishing process
- search and browse process

(b) OPUM Repository

Based on Barton and Waters (2004), institutional repository is a database with a set of services to capture, store, index, preserve and redistributes university's scholarly research in digital format. Additionally, Lynch (2003) wrote that institutional repository can encourage the exploration and adoption of new forms of scholarly communication and make effective preservation toward scholarly contents (e.g: teaching, learning and research material).

This OPUM's framework identifies the term *OPUM repository* to refer to the system structure abilities to store and retrieved scholarly and intellectual materials created by the academic communities in UM. The idea to create an *OPUM repository* for OPUM system is that it can perform as a database of scholarly materials and support resources for scholarly communication activities and processes within OPUM system. In this context, material refers to the type of works the academic journals publish (Hovav and Gray , 2002). The materials such as journal, research writing and others are served through services and interaction process by the societies according to particular stream.

6. Conclusion

Electronic publishing is a frontier looked upon with great interest, particularly in academic circles in Malaysia. For University of Malaya, the existence a new system such as Online Publishing in the University of Malay is very important in order to encourage the information sharing among the communities itself. In this paper, we have proposed a framework for online publishing system; 5S which it is refer to Streams,

Structures, Spaces, Scenarios and Societies is important in.

Thus, this framework suggests seven mechanisms or components which reside within two main structures of OPUM system; OPUM Interface and OPUM Management System. Each mechanism should works and integrates together to successfully sustain the functional and operational of OPUM system. However, this framework does not concern on another important issues in electronic publishing such as legal, market and sustainable economic model.

Adapting, integrating and establishing OPUM framework based on two different frameworks is apparently to provide strong mechanism which can sustain seamless knowledge activities (such as knowledge discovery, knowledge dissemination, knowledge sharing and etc.) and collaboration among the communities of UM. The establishments of a framework for OPUM system is to provide a basis for its development and ensures it fulfil the standard requirements for implementing online or electronic publishing.

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