

## DIGITAL REPOSITORY FOR PROCEEDINGS ARTICLE

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### ABSTRACT

*Digital repository is one of the tools for sharing and dissemination of knowledge. Through this system, a broader group of user can retrieve the information contained in the repository and utilized them for academic purposes. Through this repository, proceedings articles specifically articles from the proceedings of Knowledge Management International Conference (KMICe) can be stored and shared to other academician. The used of these articles in academic research and publication will increase the citation of the individual article, thus increase KMICe visibility to the world. In this paper, the design of the digital repository for proceedings article is proposed and implemented. The prototype has been tested by selected participants who have familiarity with information system and software engineering. The finding shows that the participants' acceptance towards the system is very encouraging.*

**KEYWORDS:** *Digital Repository, Proceedings Article, KMICe*

### 1. INTRODUCTION

Information storage and retrieval is the systematic procedure of gathering and categorizing data so that they can be located and displayed on request. Computers and data handling systems have made possible the high speed, selective retrieval of large amounts of information for government, commercial, and academic purposes. Information retrieval systems can store entire documents, which can be retrieved by title or key words that are associated with the document. This permits full text searching, enabling retrieval on the basis of any words in the document. Some other information retrieval systems store a digitized image of the document (Onwuchekwa & Jegede, 2011).

Digital repository is one of the information retrieval systems. A digital repository can store a collection of materials for a multiplicity of purposes and users (Marshall, 1997). The materials can be used for research, learning, and administrative purposes. The digital repository can be different in scope and size, and can be maintained by individual educators, departments, or sometimes allied with an established existing libraries or organizations (Marshall, 1997). However, repository solutions are most viable and sustainable when they are built on open standards (Kichuk, 2015).

The great benefit of repositories is that they support institutions to develop intelligible and organized approach to capture, identification, storage and retrieval of their academic resources. These academic resources go beyond usual publishing regimes, and may include datasets, presentations, learning materials and research works. A managed approach to these resources enhances chances for effective use of existing research, increases chances for enhanced learning experiences and inspires cooperation within and between different disciplines and groups (Kichuk, 2015). Jamaludin & Wan\_Ishak (2011) for example proposed a repository for a collection of books title owned by lecturers at the faculty. The repository promotes information sharing among the faculty members and encourages them to share resources for academic purposes.

In this paper, a digital repository to store and manage proceedings article is presented. The repository is aimed to store and manage the articles from proceedings of Knowledge Management International Conference (KMICe). KMICe is one of the conferences organized by Universiti Utara Malaysia as a platform for knowledge sharing and discussion in the area of knowledge management. The prototype has been tested and used by selected users and the response is very positive. Most of respondents agree and support the implementation of this repository and have given positive intention to use it upon being implemented in the real environment.

## **2. DIGITAL REPOSITORY**

Digital repository can be divided into four types namely; research repository, national repository, subject based repository and institutional repository (Armbruster & Romary, 2009). Research repository is aimed to store research related results including publications and data. The contents of this repository must adhere a strict procedure and standards to maintain its high-quality output. National repository is designed to manage general scholarly materials in order to preserve the record and support its usage such as in teaching and learning. Example of national repository can be found as a part of a library's services where the materials can be accessed by academics and students.

Subject based repository is built by specific community members and are adopted by the wider community. Subject based repositories are thematically well defined and alert services and usage statistics are meaningful for community users. Institutional repository contains various materials published by the institution. Typically the materials are open access, thus can be retrieved by the members and public for teaching and learning purposes. Additionally, this repository can create global visibility to the institution and promote the available expertise (Lynch, 2003). According to Tansley et al (2003), digital repositories should have the following features:

- i. Flexible: the repositories should be flexible about the format of the data.
- ii. Make data submission easy: the repository should fit into the copy submission of its partner journals.
- iii. Gives Options: the repository should give journals the option of making data privately available during peer review.
- iv. Assigns data Digital Object Identifiers (DOIs): the repository should assign DOIs to data so that researchers can get professional credit over data citation.
- v. Promotes data visibility: the repository should allow the content to be searched, retrieved and indexed through interfaces.
- vi. Free download: the repository should allow the content to be downloaded freely and have no legal barriers to reuse.
- vii. Update option: the repository should have update feature so that the submitters may update data files when corrections or additions are desired.
- viii. Long-term preservation: a promise access to its contents forever.

## **3. METHODOLOGY**

In this study, the user requirements for the digital repository have been identified. The user requirements were gathered through the analysis of the literature and discussion with the interested parties such as the KMICe organizer and authors. These requirements were classified into functional and non-functional requirements. Once the requirements have been identified, the design of the digital repository is visualized using Unified Modelling Language (UML).

The prototype of the digital repository has been developed using PHP and MySQL database. The prototype has been demonstrated to selected academic staffs in order to validate its functionality and ease of use. The selection of academic staffs was based on their background that is familiar with information system and knowledge of software development. They have been given a series of tasks to be conducted before filling the questionnaire. The task is a basic step-by-step on how to use the system and the questionnaire for them to address their acceptance towards the digital repository. The questionnaire was developed based on Technology Acceptance Model (TAM). TAM is an information system theory that models how users come to accept and use a new system (Venkatesh, & Davis, 2000). It consists of six variables:

- i. Perceived usefulness (PU) - This is the point to which a person believes that using a particular system would improve his/her work routine.
- ii. Perceived ease-of-use (PEOU) - This is the point to which a person believes that using a specific system would be free from effort.
- iii. Perceived Behavioral Control (PBC) - Perceived behavioral control refers to people's perceptions of their ability to perform a given behavior
- iv. Attitude Towards Usage (ATU): this is the person's attitude on performing a given behavior.
- v. Voluntariness This is the person's willingness or voluntariness to perform a given behavior.
- vi. Behavioral Intention (BI) - This is defined as a person's deliberate intention or perceived likelihood to engage in a behavior

#### 4. DESIGN AND IMPLEMENTATION

Table 1 and Table 2 depicted the functional requirements and non-functional requirements of the digital repository. The main functional requirements of the system are, login, add new articles, edit articles' information, delete articles, create new password and username for the new members, search articles, add new citation, view citation, download articles, and logout. While the non-functional requirements of the system are security issues and usability issues. The security is that the system must ensure that data is protected from unauthorised access while the usability issue is related to the friendliness and ease of use of the system. As shown in Table 1 and Table 2, M, D, and O under priority column represents:

- M – mandatory requirements (something the system must do)
- D – desirable requirements (something the system preferably should do)
- O– optional requirements (something the system may do)

**Table 1: Functional Requirements**

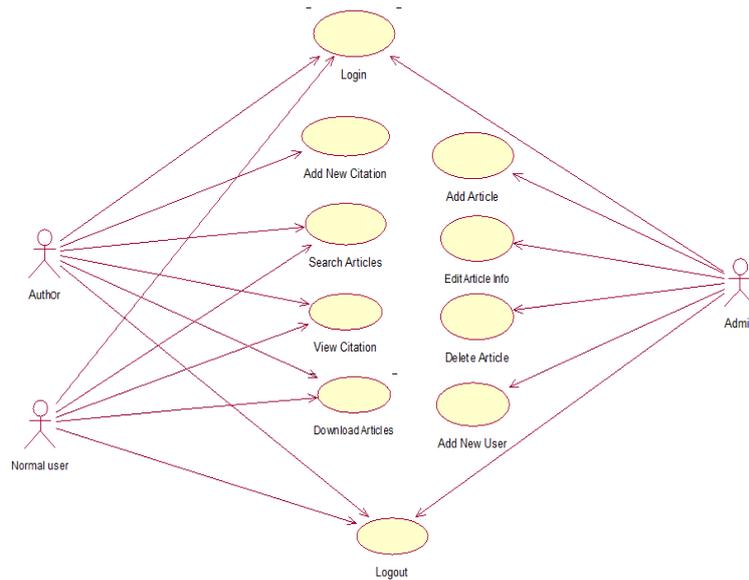
No.	Requirement ID	Requirement Description	Priority
	<b>DRS_01</b>	<b>Log In</b>	
1.	DRS_01_01	User can login to system by entering valid username and password	M
2.	DRS_01_02	User can cancel login process	D
	<b>DRS_02</b>	<b>Add New Articles</b>	
3.	DRS_02_01	Admin adds new articles in the repository	M
	<b>DRS_03</b>	<b>Edit Article Information</b>	
4.	DRS_03_01	Admin edits article information	M
	<b>DRS_04</b>	<b>Delete Article</b>	
5.	DRS_04_01	Admin deletes articles from the repository	M
	<b>DRS_05</b>	<b>Create a New system Username and Password</b>	
	DRS_05_01	Admin creates a username and password for the new members	M
6.	<b>DRS_06</b>	<b>Search Articles</b>	
	DRS_06_01	Users can search the articles based on, author name, article title	M
7.	<b>DRS_07</b>	<b>Add New Citation</b>	
	DRS_07_01	The author can add new citation in his own articles	M
8.	<b>DRS_08</b>	<b>View Citation</b>	
	DRS_08_01	Users can view the citation numbers and who cited the article	M
9.	<b>DRS_09</b>	<b>Download Articles</b>	
	DRS_09_01	Users can download articles	M
10.	<b>DRS_10</b>	<b>Log Out</b>	
	DRS_10_01	<i>Users should logout when they are done accessing services in this system</i>	M

**Table 2: Non-Functional Requirements**

No.	Requirement ID	Requirement Description	Priority
	<b>DRS_11</b>	<b>Security issues</b>	
1.	DRS_09_11	The system shall ensure that data is protected from unauthorised access.	M
	<b>SOCAMS_12</b>	<b>Usability issues</b>	
2.	DRS_12_01	System will be well designed as visual object and divided to small menus. It will be user friendly	M
3.	DRS_12_02	A member should be able to search Articles within seconds.	O

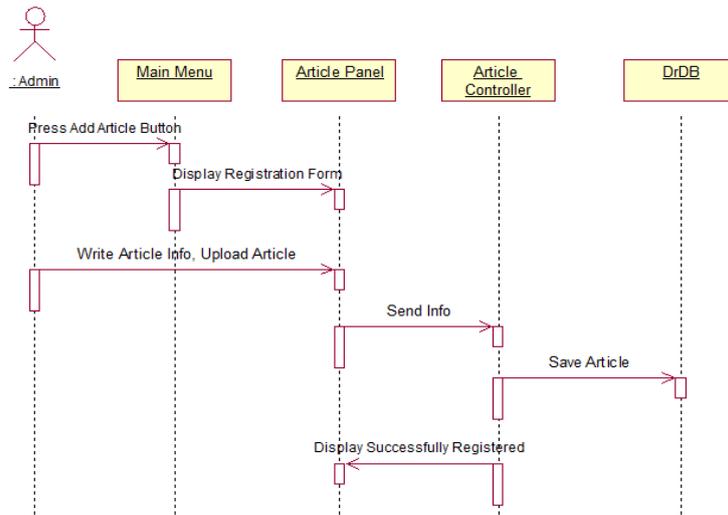
Figure 1 shows the use case diagram of the digital repository. In this study three main users have been identified: admin, author, and normal user. These three users have different roles in the system:

- Admin: The admin role in the system is to register articles in the repository and edit article information or delete articles and also to register new members in the system
- Author: The author role in the system is to check the citation of his articles and add new citation and also update his user profile
- Normal User: The normal user role in the system is to search articles and view citation of the article and also the normal user can download the articles.



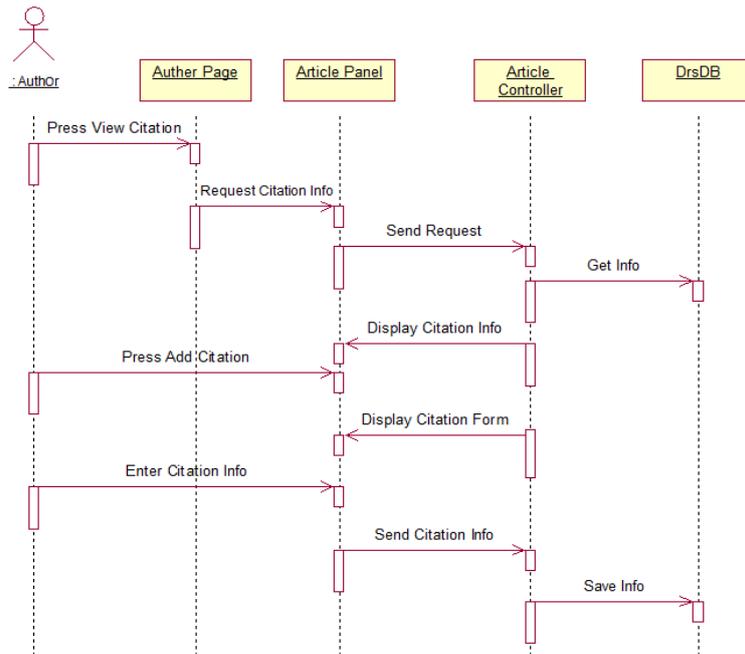
**Figure 1: Use Case Diagram**

Figure 2, 3 and 4 shows examples of the sequence diagrams that have been established in this study. Figure 2 shows a sequence diagram of the adding the articles in the system. This sequence shows what will happen when the admin upload the proceeding's articles into the repository. After the admin has successfully login, the system will redirect the admin to admin page. From the main menu, the admin can access the article registration form where the article information can be registered. Once the information has been entered, it will based saved into the database.



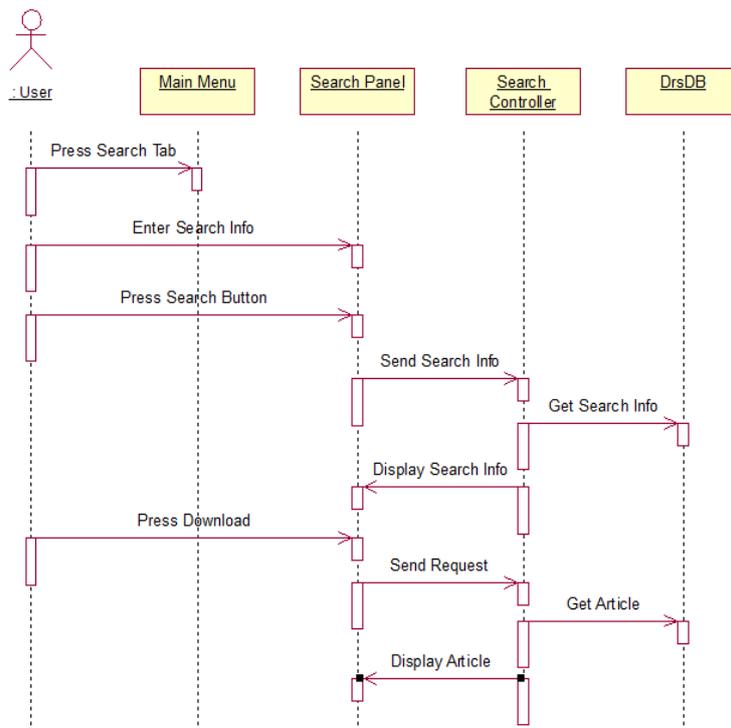
**Figure 2: Sequence Diagram for add article**

Figure 3 shows the example of sequence diagram for adding article citation information into the repository by the author. The process begins when the author wants to add a citation to his own articles. Once login, the system will redirect the author to their profile page, where the authors name and articles he/she published are displayed. By clicking on the button next to the article title, a form will appear where the author can add information about the citing article.



**Figure 3: Sequence diagram for adding citation**

Normal users can search and download articles from the repository. Figure 4 shows a sequence of action how a user can search and download an article. The process begins when the user selects the search facility from the menu tab and enter the keywords. The system will retrieve the matches' record and display the search results. User can click on the download button associated to the article to begin downloading. Figure 5 shows the main interface of the digital repository.



**Figure 4: Sequence Diagram of the system download article**



Figure 5: Main Interface of the digital repository

## 5. FINDINGS AND DISCUSSION

In this study 30 academic staffs from the School of Computing have taken part in the validation process. The participants have been given a set of instruction and demonstration on how use the prototype. After the session, the participants are given a set of questionnaire. The questionnaire consists of 7 point scale that starts from 1 (strongly disagree) to 7 (strongly agree). Among the participants, 21 (70%) of them are male while the rest are female (30%). Most of them have experience using digital repository before (63.3%). Table 3 shows descriptive analysis of each TAM variable.

Table 3: Descriptive analysis (N=30)

	Min	Max	Mean	Std. Deviation
<b>Perceived usefulness of the system</b>				
Q1: Accomplish tasks more quickly	2.00	7.00	5.23	1.330
Q2: Improved quality of work	3.00	7.00	5.03	1.272
Q3: Easy to search the article	1.00	7.00	5.06	1.507
A4: Improved productivity	2.00	7.00	4.93	1.412
Q5: Greater control over the search activity	2.00	6.00	4.80	1.126
Q6: Enhances effectiveness of article searching	2.00	6.00	4.86	1.105
<b>Perceived ease of usage of the system</b>				
Q1: Interaction with the system	2.00	6.00	4.93	1.142
Q2: Easy to use	1.00	7.00	4.93	1.529
Q3: Easy to learn	3.00	7.00	5.00	1.144
Q4: Rarely become confused	2.00	7.00	4.86	1.306
Q5: Rarely make errors	2.00	6.00	4.70	1.207
Q6: Rarely frustrated	2.00	7.00	4.40	1.354
<b>Perceived behavioral control</b>				
Q1: Use the system confidently	1.00	7.00	4.96	1.188
Q2: Adequate knowledge	1.00	7.00	4.86	1.357
Q3: Adequate resources	2.00	7.00	4.90	1.155
Q4: Ability	3.00	7.00	5.13	1.136
Q5: Control	3.00	7.00	4.86	1.195
<b>Attitude towards use of the system</b>				
Q1: Digital Repository is good idea	3.00	7.00	5.63	.999
Q2: Digital Repository is unpleasant	1.00	7.00	3.60	1.544
Q3: Digital Repository is important	4.00	7.00	5.36	.927

<b>Participant's voluntariness</b>				
Q1: Voluntariness	1.00	7.00	5.06	1.387
Q2: Digital Repository system is not a compulsory	3.00	7.00	4.93	1.112
<b>Behavioral intention</b>				
Q1: Intention on continuous use	3.00	6.00	4.83	.912
Q2: Intention on frequently use	3.00	6.00	4.63	.850

As shown in Table 3, the mean value of each question is more than 3.5. This indicates that most of the respondents have a positive feedback over the questions. The response on the perceived usefulness of the system shows that the respondents agree that the digital repository is useful to them. In terms of ease of use, all items have mean value more than 4. This indicates that the system is easy to use and operated. The participants also agree that they have the ability, adequate knowledge and resources to control the system's operation. Furthermore, participants also agree that there is a need for the system, thus support the idea of implementing the system at the institutional level. They also agree that the system can be an important source of knowledge. Upon implementation in a real environment, the respondents have given an intention to continuously and frequently use the repository to search and retrieve the KMICe proceedings' articles.

## 6. CONCLUSION

The proposed digital repository for KMICe proceedings' article is a first step toward knowledge and resources sharing in an academic environment. The implementation of this repository will encourage the download of the articles, thus increase its citation number. In addition, this repository can be one of the promotion tools to promote KMICe and increase its participants in the future.

The design of the digital repository can be enhanced by considering display and retrieval from mobile devices such as tablet and smart phone. The interface design needs to be customized to full fill various users' background and needs. Other functionalities need to be identified to serve users worldwide.

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