

A Systematic Literature Review of Web Content Management System Implementation

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Abstract:

Prior to the development of content management system (CMS) it is important to conduct a systematic literature review (SLR) study to investigate the development of research on content management system (CMS). There are many research have been done regarding content management system, especially web content management system (Web CMS). One of the methods that can be used for systematic literature review (SLR) is the Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA). As the result, we classified Web CMS development into four domain classifications: general, medical, education, culture and business. First, CMS in general domain presented by Makitalo et al. (2011) conducted research regarding the nature of Web CMS. Swierad, Zabierowski, & Napieralski (2009) works presented universal editorial content management system. Liu et al. (2010) delivered and grouped the features of CMS into four groups, including website, resource management, user and rights management and personal information management. Second, CMS in education domain presented by many researchers, i.e. Rivera et al. (2010) proposed WikiDIS project, Staccini et al. (2007) purposed CMS built-in Dublin Core metadata, Reddig et al. (2008) designed CMS usability oriented, Xiang (2008) proposed CMS for student records, Zhang et al. (2010) delivered the Web CMS for education, Doinea et al. (2010) presented the design, architecture and implementation of the content management system named WeLearn, and Kurilovas (2009) proposed Learning (Content) Management Systems (LMSs). Third, in medical domain, CMS has been developed by Krechel et al. (2006) and Masud et al. (2012)[1][1][1][1][1][1]. Fourth, Sookhanaphibarn&Thawonmas (2009) designed Content Management System (CMS) for arranging digital information in museums. Fifth, Nordheim&Paivarinta (2004) explores the concept of customization related to ECM system and its role in the requirements definition phase of such development initiatives.

Keywords —systematic literature review, content management system

I. INTRODUCTION

The number of businesses classified as Micro, Small Medium Enterprises (MSMEs) reached 53.82 million from the number of businesses in Indonesia[2]. This shows that Micro, Small Medium Enterprises (MSMEs) is a significant driver of economy and business in Indonesia [3][4]. One of the supports that can drive business development for Micro, Small Medium Enterprises

(MSMEs) is the support of Content management system technology (CMS)[5].

Prior to the development of content management system (CMS), it is important to conduct a systematic literature review (SLR) study to investigate the development of research on content management system (CMS). SLR approach is done by searching, collecting and analyzing scientific literature that aims to answer the research questions that have been determined[6].

There are many research have been done regarding content management system, especially web content management system (Web CMS). Those researches deliver many contexts of Web CMS, such as methodology of development, field, component, feature and technology. The important of this study is to present insight to developer or research before developing a Web CMS in several cases[7], [8]

One of the methods that can be used for systematic literature review (SLR) is the Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA). PRISMA method was originally an SLR method that is widely used in the humanities sciences, but the last few years adapted by other fields of science one of the field of computer science, as done by[9]–[11].

Based on the above background, this research will use PRISMA method to perform the systematic literature review (SLR) as a preliminary study to obtain comprehensive in-depth information about content management system (CMS). This paper attempts to classify related research into four domain classifications: general, medical, education, culture and business.

II. RELATED WORK

Research using a systematic literature review (SLR) is a preliminary study to provide comprehensive in-depth information about a particular object of study. One of the methods used for systematic literature review (SLR) is the Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA). PRISMA method is the beginning of the SLR method that is widely used in the humanities, but the last few years adapted by other fields of science one of the field of computer science, as done by[9]–[11].

III. METHODOLOGY

The proposed research uses a systematic approach in conducting a literature study known as systematic literature review (SLR). SLR approach is done by searching, collecting and analyzing scientific literature that aims to answer the research questions that have been determined[6].

The Systematic Literature Review (SLR) approach used in research is the Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA). The PRISMA method provides a guide consisting of 27 points in the form of a recommended checklist for creating an SLR, which can facilitate the review paper[6]. The stages in the PRISMA method can be seen in Figure 1.

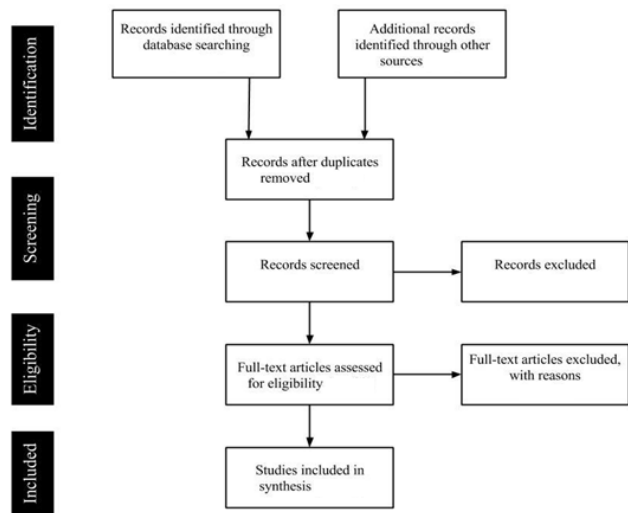


Fig.1 Stages in PRISMA Method (Adapted from [6])

In the identification stage will be a search of scientific papers in the database provider of scientific journals of information technology using a predetermined keyword that discusses the content management system. The stage of screening and eligibility is performed by eliminating irrelevant scientific work. The last stage that is included is done by studying the relevant scientific work and writing a summary of the topic content management system.

IV. RESULT

Based on literature review, we classified Web CMS development based its domain and was discussed below.

A. General Domain

This section elaborated research related to Web CMS in general domain, in case the purpose of Web CMS is developed for general use [12] conducted research regarding the nature of Web CMS. This paper stated there are two kind of the nature of Web CMS. They are content and feature. Content mainly related to metadata and essence. Based on Swierad, Zabierowski, & Napieralski (2009) works presented universal editorial content management system. This paper also mentioned several features should be added into CMS[13]:

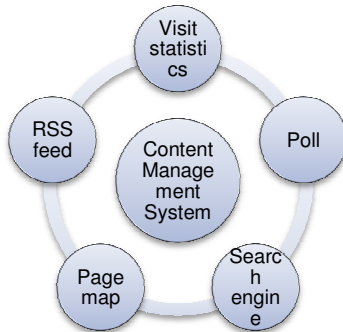


Fig.2 Feature of CMS proposed by [13]

In other research, Liu et al. (2010) delivered and grouped the features of CMS into four groups, including website, resource management, user and rights management and personal information management as below[14]:

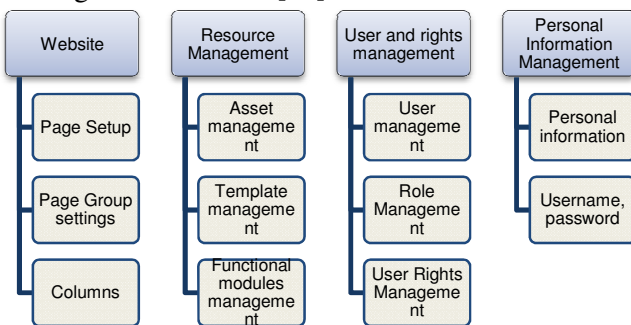


Fig.3 Feature of CMS proposed by [14]

Moreover, Nath&Arora (2010) work deliver features on several open-source CMS as many 29 features, the detailed presented on Figure below.

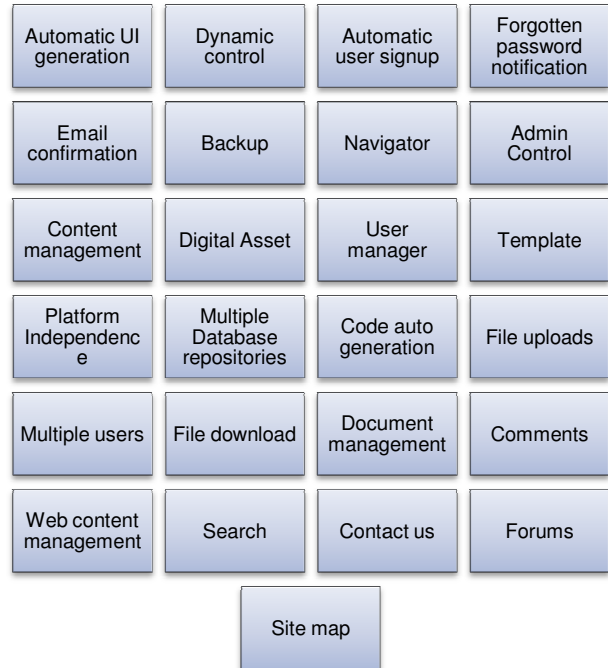


Fig.4 Feature of CMS proposed by [15]

B. Medical

In medical domain, CMS has been developed by Krechel et al. (2006) and Masud et al. (2012) [1][16]. Krechel et al. (2006) designed hospital content management system named LENUS. This system can handle the integration of all data needed (including documents, reports, images and multimedia objects) for medical and administrative process. To manage structured and structured content, LENUS adapted Digital Imaging and Communications in Medicine (DICOM) and HL7 as a content metadata[16].

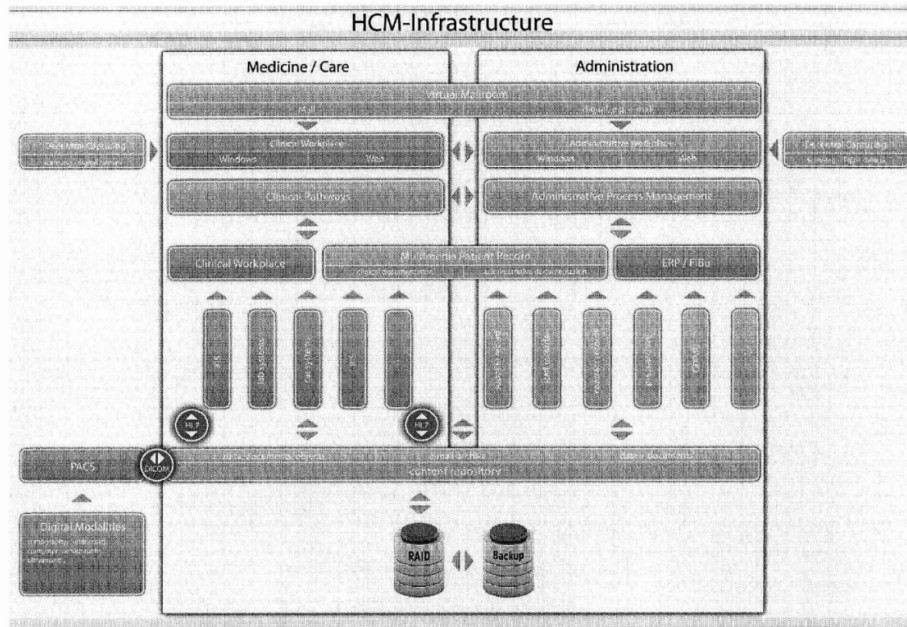


Fig.5CMS Lenus proposed by [16].

The component of LENUS grouped into three areas, the description of areas will respectively be elaborated below:

1. Electronic archiving which supports information lifecycle management.
2. Inbound management which supports knowledge based classification and extraction of document.
3. Clinical process management which supports continuous and process-oriented activities of medical, nursing and administrative documentation.

In similar domain, Masud et al. (2012) designed CMS provided a collaborative platform for sharing patients' medical data including X-ray, ECG, MRI, and ultrasound images. This research focus on interoperability solution for sharing data among heterogeneous data sources [1].

To sum up, CMS for medical domain relates to clinical process. The system should be managed medical data such as including X-ray, ECG, MRI, and ultrasound images by adapting metadata standard of medical domain (e.g. DICOM and HL7) to support interoperability across other systems.

C. Education

There many researchers have been completed CMS for education domain, including Rivera et al. (2010) proposed WikiDIS project [17], Staccini et al. (2007) purposed CMS built-in Dublin Core metadata [18], Reddig et al. (2008) designed CMS usability oriented [19], Xiang (2008) proposed CMS for student records [20], Zhang et al. (2010) delivered the Web CMS for education [21], Doinea et al. (2010) presented the design, architecture and implementation of the content management system named WeLearn [22], and Kurilovas (2009) proposed Learning (Content) Management Systems (LMSs) [23].

Rivera et al. (2010) works is to accomplish the WikiDIS project. This project is to implements a collaborative content management system in an educational university organization. The system with feature to integrate the educational community that can produce, a controlled way, the contents for the information system of organization [17]

In similar domain [18] purposed a system by adapted built-in Dublin Core metadata. This paper also presented the data model of system which presented in Figure 6.

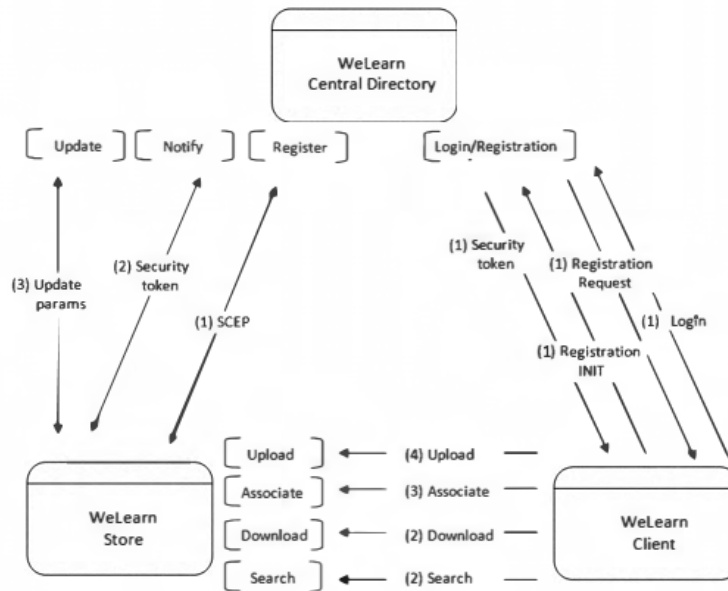


Fig.7 WeLearn architecture[22].

In [21] paper deliver the characteristic of Web CMS in education field, the following characteristics, resource sharing using service technology of RSS and Web, feature to maintain course content, feature to classified, and the contents which are browsed or managed by the different user can be classified arbitrarily, feature provided method of HttpHandlerFactor to process the teaching materials. Moreover, the main research conducted by Kurilovas (2009) is the analysis of learning content and software customization problems. Learning content is usually described by metadata and stored in Learning Object / Content Repositories (LORs) or Learning (Content) Management Systems (LMSs) [23].

D. Culture

Sookhanaphibarn&Thawonmas (2009) designed Content Management System (CMS) for arranging digital information in museums. Six proposed system components are the integral parts of CMS to handle data mining approaches inspired by a visiting pattern retrieval system of audience activities and web-based recommender systems[24].

Giouvanakis et al. (2013) designed a web content management system (Web CMS) to host a corpus of 405 folk songs for media sharing [25].

E. Business

Nordheim&Paivarinta (2004) explores the concept of customization related to ECM systems. This paper contributes by grounding the concept of customization in ECM systems and its role in the requirements definition phase of such development initiatives[26].

The major customization needs for Web CMS, including non-functional integration between an ECM software and existing software tools and infrastructure. Non-functional configuration and simplification of user interfaces. Functional adaptation and simplification of the ECM package in relation to the enterprise’s content model, storage management and delivery requirements, and workflows. Functional customization In general the customization of ECM functionality was referred to as adaptation of the package in connection to its organizational implementation. Non-functional customization by integrating with Web publication tools, MS Office, Collaboration suite and search and content classification / taxonomy tools of the future[26].

V. CONCLUSION

Based on literature review, we classified Web CMS development into four domain classifications: general, medical, education, culture and business.

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