

CERTIFICATION OF APPROVAL

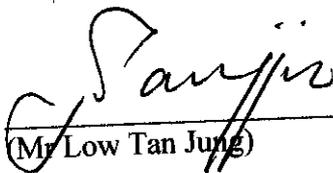
Content Management System for Mobile Devices

by

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Approved by,


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CERTIFICATION OF ORIGINALITY

This is to certify that I am responsible for the work submitted in this project, that the original work is my own except as specified in the references and acknowledgements, and that the original work contained herein have not been undertaken or done by unspecified sources or persons.



MARIANI BT BASIRAN

ABSTRACT

The main objective of this project is to develop a management system that manages web contents using mobile devices and deliver materials based on the capabilities of the mobile devices.

Currently, most people rely on websites, televisions, ads and posters to keep update with what is going on in Malaysia for cultural information. However, not all of us manage to keep track of cultural events and other information as we have many other activities to take care of. So, this FYP purposes to build a system that will alert users on the culture news, notices, events, and information.

The CMS is allowed to make website content changes without compromise that the site's design or structure. Administrators maintain full control over anything that moves on a live website. CMS shall fulfill the management needs of IT personnel while empowering non technical team members to contribute to sites without complex coding involved.

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LIST OF ABBREVIATIONS

CMS	Content Management System
CSS	Cascading Style Sheets
DFD	Data Flow Diagram
FTP	File Transfer Protocol
HTML	Hypertext Markup Language
HTTP	Hypertext Transfer Protocol
IT	Information Technology
PDA	Personal Digital Assistant
PHP	Hypertext Preprocessor
RAM	Random Access Memory
UTP	Universiti Teknologi Petronas
WAP	Wireless Application Protocol
WML	Wireless Markup Language
XML	Extensible Markup Language

CHAPTER 1

INTRODUCTION

1. INTRODUCTION

1.1 Background of Study

A Content Management System (CMS) for Mobile Devices is a system used to organize and facilitate collaborative content creation for mobile users. CMS is a mobile-based content management system that delivers both administrative control and user empowerment using mobile devices. This CMS has flexible and complete administrative control of the website's content creation and movement on cultural information including the cultural events, announcements, news, songs, movies and so on. CMS also enable users to quickly update and edit site content while maintaining control of the review, approval and publishing process without using personal computer. CMS solves the "bottleneck" problem faced by many users that need a fast, easy way to maintain fresh Web content.

CMS allow end-users typically authors of some sort to provide new content for the website. The content typically entered as plain text, perhaps with markup or user can upload other content such as images, songs, movies etc for easy retrieval and editing by using their mobile phone. The system then uses rules to style the content, which has a number of advantages when trying to get many contents to conform to a consistent "look and feel". The system then adds the contents to a larger collection for publishing. The systems also often include some sort of concept of the workflow for the target users which defines how the new content is to be routed around the system.

CMS is ideal for organizations to empower staff members to make website content changes anytime and everywhere through mobile devices without worrying that the site's design or structure will be compromised. Administrators maintain full control over

anything on the website without involved in actual changes being made. Mobile CMS fulfills the management needs of IT personnel as well as empowering non technical team members to contribute to sites. There are two main users for Mobile CMS in the organizations, the administrators and the contributors.

- **Administrators**

With CMS, administrators can use templates to separate the site's design from its content, control what content is editable with HTML comment tags, control accessibility to files and create work groups with customizable workflow processes. Administrators also can publish single pages or the entire site over a network, using File Transfer Protocol (FTP). Administrators can even schedule automatic backups for the entire site. Browser-based administration means no client software installation or configuration.

- **Contributors / Normal Users**

If the contributors or normal users can use a word processor, then they can use CMS. Contributors do not need to understand web-publishing technology to make changes to the website, and it's accessible from any mobile devices on the Internet. Contributors also can ensure the right content makes it to the live website using CMS's advanced workflow.

1.2 Problem

1.2.1 Problem Identification

In Malaysia, three main cultures come together to form the Malaysian culture. These are Malay, Chinese and Indian cultures. Though they remain different in some traditional aspects, they are slowly becoming assimilated. Thus, it is important to us to learn about those cultures and keep it for the future. Information such as events, literatures, music, traditional dances are important things for the citizen especially young citizen in order to

learn about our culture. It is thus significant to keep all citizens update with activities, events and new information every now and then.

Currently, most citizens rely on websites, televisions and posters to keep update on what is going on in Malaysia in terms of cultural information. However, not all of us are able to keep up to date regarding cultural events and other related information as they have our own other activities. So, most likely they will not be able to notice some of the important news and announcements that have been published. By developing this CMS for mobile devices, it will ensure that all Malaysian citizens will be alert with all of the culture news, notices, events and information that have been published through mobile devices.

In addition, most of the cultural contents are managed by the CMS. It is difficult for the user especially if they want to manage their contents without sitting in front of the computer. Let say if the user saw an advertisement regarding Songket Exhibition. The user can enter the events information to the website using mobile phone. So, the main thing that the author wants to emphasize is using the mobile phone instead of web CMS to manage cultural contents anytime and anywhere.

1.3 Significant of Project

Based on problem above, it is significant to build a system on CMS that will provide efficiencies and effective features for the user to publish and obtain new information by using mobile phone. This CMS will allow the user to publish new information that he or she knows and share it with other. The uniqueness of this system is not only the administrators have the right to publish the contents but the normal users, the mobile user itself can publish the information that are related to the contents. Moreover, any changes for the web content can be made any time and any place by only using mobile phone. Besides that, all the technical details are simply handled by the CMS, allowing any user to manage and update the site. So, multiple users can keep the site up to date, instead of

being restricted to just one person. The CMS will track who is doing what to avoid potential confusions.

1.4 Objective and Scope

1.4.1 Objective of the Project

The main objective of the project is to develop a content management system that can manage web contents using mobile devices and deliver materials based on the capabilities of the mobile devices. Besides, the system will also provide effective method in publishing the web contents regarding cultural information including events, announcement, news, music, etc. The system will implement the role based workflow that allowing multiple users to submit, review and publish information at anytime and any place in a controlled manner as well as the audit mechanism to see what has been published and by whom.

1.4.2 Scope of the Project

The scope of this project will cover several aspects. The first aspect to focus on is creating an effective CMS mobile-based application. Certain criteria need to be considered in developing the CMS mobile-based application such as the response time and the web design. Thus, it is important to focus on a simple design for a mobile based application. The second aspect is on security issues in CMS mobile-based application. In developing the system, the author should be aware of the system maybe attack by the hackers. Thus, security needs to be included in this system. The third aspect is on improving information accuracy. All news, events, announcements, and any other cultural information should be accurate, up-to-date and comprehensive. The fourth aspect is improving knowledge sharing. By implementing the Mobile CMS, direct users communication, and 'peer-to-peer' sharing of information are two of the most effective ways of spreading knowledge. The Mobile CMS website will provide both an environment and the tools to facilitate these processes.

1.5 The Relevancy of the Project

CMS has been recognized for years by internet users. Many organizations use CMS in order to make website content changes without worrying that the site's design or structure will be compromised. Administrators maintain full control over anything that moves to the live website without the need to be involved in actual changes being made. CMS fulfills the management needs of IT personnel while empowering non technical team members to contribute to sites without complex coding involved. Therefore the development of this project is relevant to the CMS for cultural information tracking or alerting.

1.5.1 Feasibility of the Project within the Scope and Time Frame

The author was given two semesters to develop the CMS. Within the time frame, the author needs to gather information from any sources and come out with the prototype or end product by the end of the first semester. By the end of second semester, the author should manage to complete the whole system. The area and scope of the project should be narrowed down so that the project is feasible and could be completed within the allocated time frame.

CHAPTER 2

LITERATURE REVIEW

Content Management Systems (CMS) are used to store and subsequently find and retrieve large amounts of data. Content management systems are currently wide-spread, especially when thinking of so-called web content management systems, which enable dynamically created web pages. Content Management Systems work by indexing text, audio clips, images, etc., within a database. In addition, CMS often provide version control and check-in/check-out capabilities. Using robust built-in search capabilities, users can quickly find a piece of content from within a database by typing in keywords, the date the element was created, the name of the author, or other search criteria [3]. The definition of content management systems does not restrict content in any way. Content may be text, images, audio, video, program code, binary data or anything else. These systems are thus used for creation and administration of catalogues, CD-ROMs, books, web-sites or other collections of different content types.

Clare Rogers & John Kirriemuir (2003) stated that a Content Management System (CMS) was developed [2] to allow the storage and manipulation of web site content. CMS users were provided with direct editorial access to defined and appropriate portions of the content. Such a system therefore allows distributed JISC staff, and other CMS users, to mount content on the web site as soon as it has been created.

The CMS requirements are content creation, content management, publishing, presentation, and business. In the content creation functionality, the key requirements may include integrated authoring environment, separation of content and presentation, multi-user authoring, single sourcing, powerful linking, metadata creation and ease of use. The requirements for content management functionality are version control and archiving, workflow, security, and integration with external system. In the publishing, some of the things that need to be considered are style sheets, page templates, extensibility, and support multiple format of articles. While in the presentation manner, the usability, cross browser support and speed are main requirements for good CMS. [1]

There is a lot of authoring environment that can be used in CMS such as:

- **WYSIWYG (What You See Is What You Get) authoring**

This tool using the central concept of such as an interface is the 'topic' that is a single page on the pages. The topic will structure based on hierarchy and will be the basis for website navigation. The editing features in this tools including separation of presentation and content, paragraph and character styles, support for WYSIWYG table editing, creation of hypertext links and related topics, and instant preview of topic. This tool also provides flexibility and structured CMS.

- **Markup-based authoring**

This tool use special text 'markup' within the content to indicate structure and formatting such as creating HTML tags or simpler markup. This tool makes it simple to create content but the users must have good knowledge on it.

- **Template-based authoring**

Using template is easy, simple, and structured authoring option in content creation. Using this tool make the effective development when it come to the content that need a lot of topics with page layout and design such as catalogue. Using templates make the information creation simpler with specific fields to insert the information and specific locations of where the information will take place. The template-based editing may offer some user-friendly option such as spell-checking, creation of hypertext-links to other topics, and controlled access to templates. This tool also has some available elements such as drop-down lists, radio buttons, check boxes, and other interface elements.

- **Authoring using desktop applications**

This tool is suitable for business documents that are created using applications such as Word or Excel. In this case, the users still can continue using these tools to create content. Some of the features are integration between the CMS and desktop application, menu items to check the documents flows, built-in authoring

templates, and ability to create hypertext links to other documents, and integrated version control and archiving.

- **XML-based authoring**

XML-based authoring is complex and highly-structured content. It is difficult to edit in template-based environments or in the web based. A powerful editing tool should be provided to manage the content creation.

- **Importing from data sources**

This tool is used to import the existence information from database and other sources available. It provide tool to import the information needed directly into the repository and then will integrated with other content or else directly published to the CMS site.

The important thing in creating the CMS is selecting the right tools for the right type of CMS, which is crucial in order to ensure the success of the CMS development. Nowadays, market focuses on how usable and simple the tools in managing the content creation. The general rule is this: the more users that will be using the authoring tool, the simpler it needs to be. [4]

CMS will make the content creation and management much easier and simpler. There are a lot of benefits in implementing the CMS. With using CMS, the changes in the web design were no longer dependent only to the web designer. In these cases, changes can be made anytime when the content need to be update or modified. This frequent update will benefit the businesses that rely on the website as a communications channel. With the management of the CMS not rely on specific person and allow anyone to manage the site, the technical to manage the content are handled by the CMS. Moreover, with the multiple people can manage the CMS, it can track who is doing what to avoid potential confusion. This also ensure only specific person can update specific site. The CMS that provides the consistent of page templates with look and feel design will make the use of CMS much better and structured. [5]

Compared to a file system, this database manner offers CMS several benefits:

- **Concurrency management and version control.**
In normal file system, more than two people can edit the same content at the same time, but only one person's edition will take place. But with CMS, it stores contents in tables structured to support multiple versions, and the database manages concurrent access.
- **A consistent and structured look and feel of web pages.**
The CMS builds template web pages with basic standard design elements and navigation items from the database. Users can simply modify make it by editing the template.
- **Access control**
Changes in content creation can affect the performance in publishing part of the site. To ensure only right people can access their responsible part, CMS grants access privileges at various levels based on user roles.
- **Fast searches**
It has interMedia option which indexes text in the database thus will increase searching performance. [6]

With the increase in mobility of the modern professional, mobile content management issues have come to the forefront as the concerns of getting critical data and applications to the external workforce mount. Mobile office actualization is a palpable reality, as outsourcing rises. Wireless device application updates must occur automatically, assuring that all users can view data with proper formatting.

Managing mobile content

A mobile content management system must be based on flexible data structures and be able to:

- Manage third party provider and content aggregator relationships
- Manage each stage of the mobile content process

- Manage web and WAP discovery portals
- Implement segmentation models and create content bundles to develop a dynamic content catalogue
- Support multiple content types and digital rights management policy

Content Management System Advantages

CMS are concerning about the latest and update information. The main thing is to produce the most basic CMS with emphasis on the mobile phone to work on the WAP browsers with fresh information.

There are some advantages of using the CMS, specifically in using the development standards. The use of development standards are suitable in terms of template design and quality of code generated by the system can ensure the easy management and fast content creation. CMS also using a lower bandwidth because of the simple basic design need less time to load. Thus, the time and money saving can be produce in this part. With less time taking in loading pages, it will make visitors to stay on in the website and come again after that. [1]

CMS Development Standards also reduced development time for future re-designs. By using basic and simple template design, the structure of content such as headings, lists, images, and paragraphs will have less work to do and all the efforts will goes to the way that content is presented. This also will automatically emphasis the ease of use the CMS, with structured content and design to ensure the publishing content will satisfy the users with fresh and easy to archive information The production and maintenance costs are also reduced with less work need to produce multiple versions of pages to cope with the quirks of different browsers.

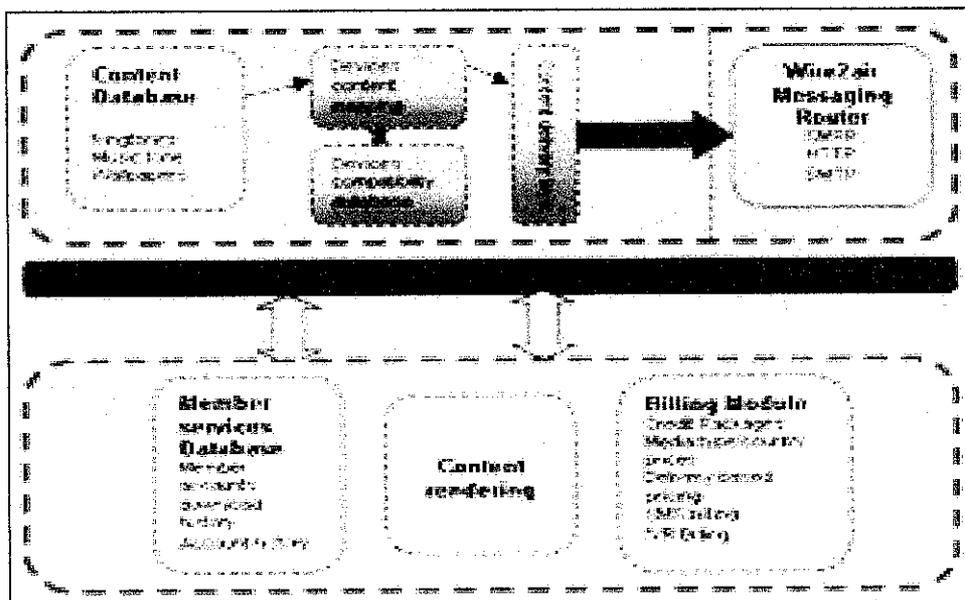
Moreover, CMS also give freedom from proprietary technologies: CMS will no more dependent on specific browsers and not only generate web page that will only work on a personal computer but also in a mobile phone. As we know, the CMS contains pages that

are well structured. Thus, it is ease for search engines to search information more accurately.

Wire2air Mobile Content Delivery Platform

Wire2Air's Mobile content delivery platform provides a versatile platform to the new age Application Service Providers and Enterprises for managing, storing and distributing all their wireless media, images, sounds and streaming video to mobile subscriber base. The providers can benefit from a variety of revenue models, securely built around a multi-layer transaction engine. Wire2Air MCDP is developed using state-of-the-art Microsoft .NET technology and has a highly scalable architecture. The system provides intuitive user interaction through its Web Interface, which makes Content Uploading, Managing and managing content as easy as breeze.

Wire2Air MCDP offers an intelligent platform for the creation, personalization, conversion and distribution of mobile multimedia messages- supporting all messaging and network technologies. Wire2Air MCDP enables operators and Value added service providers to manage and delivery large-scale multimedia contents.



Features:

- Centralized content management.
- Intelligent content selection
- Easy integration with external content partners.
- Dynamic front-end rendering
- Supports multiple portals
- Web, WAP and PDA, Premium-SMS support
- Flexible delivery channels using SMS, MMS, WAP-Push, OMA-download, GCD and J2ME download
- Content to device mapping
- Device management service
- DRM enabled
- Third party interfaces APIs for content publishing, billing and delivery.
- Web based administration.
- Flexible architecture, just about every facet of MCDP can be tailored to provide an implementation customized to your specific needs.

Centralized Content Management

- Add, Edit, and Delete content of various media type (Ringtone, Wallpaper, Screensaver, TrueTones, J2ME applications, etc.)
- Bulk import APIs.
- Upload multiple version of given content e.g. Midi, and MMF files for a polyphonic, J2me files for different devices.
- Manage devices and devices' capabilities database. Administrator can specify the types of content that a device can handle by defining Device Capabilities. By mapping these capabilities to Devices it is possible to specify the different categories of content that a Device can handle.
- Assign different file types to media type and devices. E.g. *.Mid to Polyphonic-Nokia 3650, *.MMF to Polyphonic -Samsung.

- Assign devices to a specific version of a given content.
- Content Search functionality.
- Preview content.
- MCDP comes with support of the following media types:
 - POLYPHONICS
 - MONOPHONICS
 - TRUE TONE
 - MUSIC TONE
 - VOICE TONE
 - WALLPAPERS
 - SCREEN SAVER
 - JAVA APPLICATIONS (GAMES, & UTILITY)
- Digital Rights Management

CHAPTER 3

METHODOLOGY / PROJECT WORK

3.1 Procedure Identification

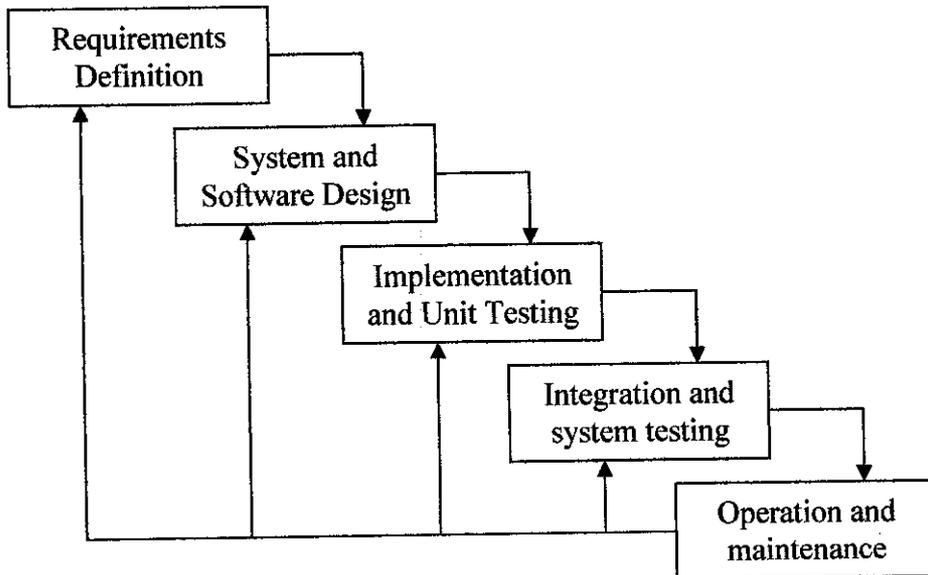


Figure 3.1.1: The Waterfall Model

Methodology used in the progress of this project includes information gathering through research on internet and books. The project had five important stages that are requirements definition, system and software design, implementation and unit testing, integration and system testing and operation and maintenance. At Requirement Definition stage, the author will interact more on the problem statement. Researches and studies will be carried out to get more information from the books or Internet. At System and Software Design phase, the system will be built using the selected tools and software in order to create a user-friendly yet functional and attractive user interface which will smoothens the process of time recording. Based on the requirements and interface, segments of coding will be done to make the system fulfills the objectives and functional requirements. During Implementation and Unit Testing, percentage of facing several

errors in running the program is high. Therefore, in the unit testing stage, the coding of each segments of the system's function will be tested upon completion of source code debugging processes. Software system testing will be conducted once the CMS is completed before releasing to the public. Basically, within this stage, the system will be installed and tested in assurance it works according to the project specifications. At the last stage Operation and Maintenance, Normally the system is installed and put into practical use. Maintenance involves correcting errors which were not discovered in earlier stages of the life cycle, improving the implementation of the system units and enhancing the system's services as new requirements are discovered.

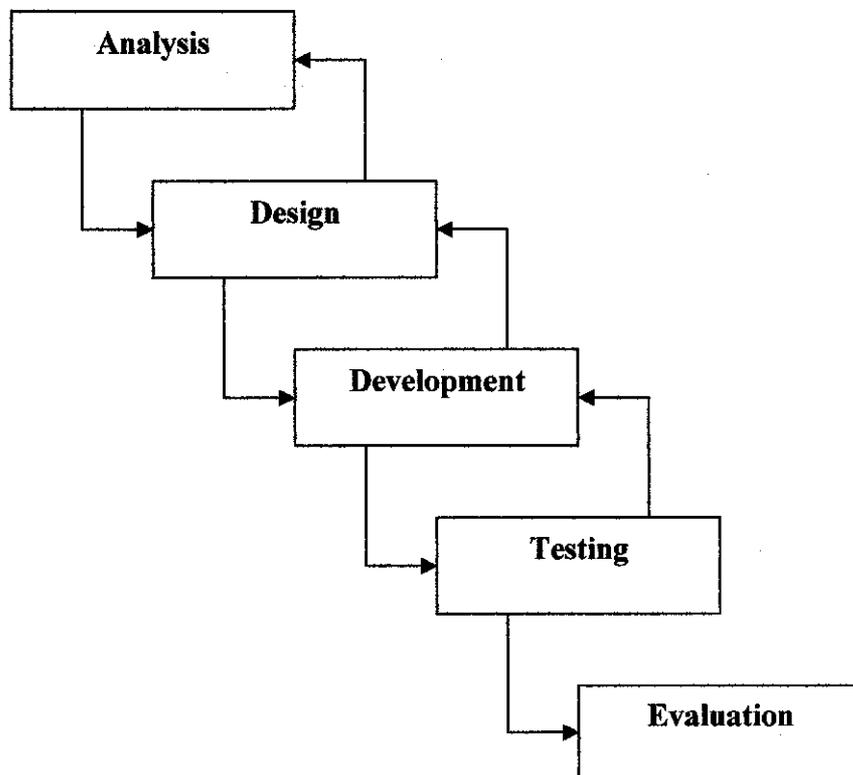


Figure 3.1.2: Phases involved in developing Mobile Content Management System

3.1.1 Analysis Stage

At this phase, the author had identified the problem statement, scope of study, objectives, and goals to be achieved in developing the Content Management System (CMS). The purpose of developing the system is to provide a system that fully effective and efficient in order to publish the news, notices, announcements, and other information faster rather than the current process. The author also had gathered information that is related to the project through research on the internet and books. Throughout this phase, the author had identified the methodology and tools required to develop the system.

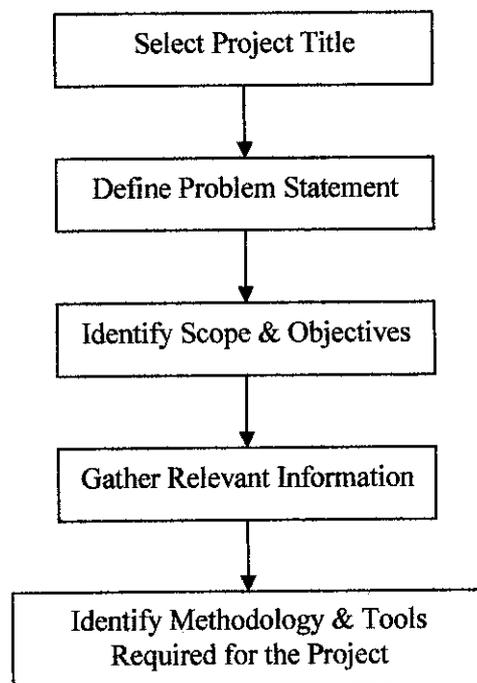


Figure 3.1.1.1: Tasks Involved in Analysis Stage

3.1.2 Design Stage

Throughout this phase, PHP, WML and MySQL programming language had been applied in developing the system. The author had to learn on the usage of those tools required by the system since it is one of important criteria in developing the mobile-based

application. The author also had designed the workflow of the system. After that, the author has to design the user interface for the system.

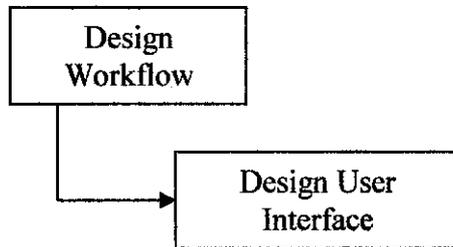


Figure 3.1.2.1: Tasks Involved in Design Stage

3.1.3 Development Stage

In the development stage, the author has to create a relational database which consists of fields and tables. There are also some rules that should be created in the CMS to illustrate the system functionality. By using the system interface that has been design in the design stage, the author has developed the system interface such as the main page, registration form, login page, and editing pages.

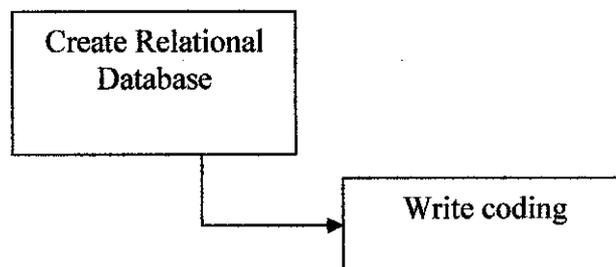


Figure 3.1.3.1: Tasks Involved in Development Stage

3.1.4 Testing Stage

The reason of having the testing phase are to review, validate, and test the modules created in the system regularly in order to check whether the system will run and perform the tasks as expected. The phase also including the activities of changes in design of the system as well as the modification of code to regenerated. Thus, when there is an error in the system, the author will find the possible solution for that error.

3.1.5 Evaluation Stage

Evaluation is the process of determining the value and effectiveness of the project. In this evaluation phase, it is performed to the real system in order to define the performance of the system. The performance evaluation is based on several criteria which are:

- Fail to meet standards
- Adequate
- Meet all standards

The evaluation is done on the functionality of the system, content, accuracy of the result, efficiency of retrieving and editing data, interactivity, and user friendliness of the system. At this stage, the author will ask the users regarding the system whether they satisfied with the system or vice versa.

3.2 Tools Required

Hardware

i) For application development

Processor	: Intel Pentium 4 1.80GHz
Memory	: 256MB RAM
Hard Disk Drive	: 40GB
Operating System	: Windows XP Home Edition Version 2002 with Service Pack 1

ii) Equipment

Any type of mobile phone that support WAP

Software

Macromedia Dreamweaver MX

Macromedia Dreamweaver is a seriously big application with advanced development tools for Web site design and maintenance. It lets designers swiftly create layouts, and developers incorporate the latest in data-driven applications. Sporting a reasonably uncluttered but intricate interface, Dreamweaver MX 2004 offers quite a bit of handholding in the form of automatic code generation and provides an excellent interface for directly accessing HTML code. This version adds features for the newest Active Server components and more powerful Cascading Style Sheet (CSS) support. Dreamweaver isn't for everyone, though. Adobe shops will be more comfortable with GoLive, and nonprofessional site designers should consider the less formidable (and less powerful) Microsoft offering: FrontPage. The list of Dreamweaver's features--XML, ASP, CSS, SQL, PHP, JSP--reads like a seemingly endless roster of acronyms. All this have two functionalities:

- Support for data-driven, interactive Web pages with coding extensions such as JavaScript, Microsoft's Active Server Pages, and Macromedia's ColdFusion. These services let you easily build dynamic components such as order forms, user authentication, and database queries into your pages without requiring an advanced degree in HTML coding.
- Extensive support for controlling the visual appearance of your site via Cascading Style Sheets (CSS) and the new image-editing toolbar.

MySQL Database

MySQL, the most popular Open Source SQL database management system, is developed, distributed, and supported by MySQL AB. MySQL is a database management system which is a structured collection of data. It may be anything from a simple shopping list to a picture gallery or the vast amounts of information in a corporate network. Since computers are very good at handling large amounts of data, database management systems play a central role in computing, as stand-alone utilities or as parts of other applications. The MySQL Database Software is a client/server system that consists of a multi-threaded SQL server that supports different backends, several different client programs and libraries, administrative tools, and a wide range of application programming interfaces (APIs). MySQL Server also provided with MySQL Database Software which is a multi-threaded library that can link into application to get a smaller, faster, easier-to-manage product.

Apache Web Server

Apache is open source software that processes requests from internet users for web files stored on a server. It is the most widely-used web server around and is often used in conjunction with other open source software such as PHP and MySQL. Apache is an open source, BSD-like license that allows for both commercial and non-commercial use. Apache users can easily add functionality or tailor Apache to their specific environment. Besides, Apache runs on nearly all flavors of UNIX (and Linux), Windows, BeOs,

mainframes and has maintain full security. Many commercial vendors have adopted Apache-based solutions for their products, including Oracle, Red Hat and IBM. In addition, Covalent provides add-on modules and 24x7 supports for Apache.

Wap Emulator (Openwave® SDK)

Openwave™ SDK 6.2.2 is a Windows-based application that you can use to test how your wireless applications work with Openwave Mobile Browser 6.2.2 and Openwave Mobile Messaging client. The SDK features a mobile phone simulator, which includes the same browser code as is embedded in real mobile phones. It also includes sample code and a generic phone configuration file, or "skin," that represents an idealized mobile phone.

Openwave Mobile Browser 6.2.2 can display content delivered in XHTML Mobile Profile 1.0 (XHTML-MP) with Cascading Style Sheets (CSS), the Wireless Markup Language (WML), MMS-SMIL, and a number of other formats.

WML Editor

WML Editor can be use to create a professional WAP/WML - pages for Internet appearance with mobile binding. The WML Editor offers everything which is necessary for an efficient program for creating WML/WMLScript documents. By different assistants and wordprocessors, who support user, both, profies as well as beginners, simply and felxibel come to the Internet appearance with mobile binding. Additionally numerous functions and automation possibilities help with easy and successful creating. New in Version 3.2 includes a Browser for previewing the documents, a WML-Element-Helper and a WMLScript-Helper for easy and fast writing.

CHAPTER 4

RESULT AND DISCUSSION

4.1 Basic Idea about CMS

The Content Management System (CMS) will apply the knowledge management in a web and mobile content creation application. This project focuses on providing a content creation system that allow user to publish the cultural contents including news, announcements, events and other related contents.

Basically CMS has two main users which are administrator and the normal user. The permission to view, publish, and edit the items will be based on the level of user. Each level of user will have different access authorization to this content creation system. As for administrator, they will be able to manage the images, users' contents, editor and categories at the administrator site which is the website. They can upload images, arrange it into different directory and publish it to the user.

CMS should display information needed by the target user correctly. It can provide the latest information to the user for cultural information. User will be able to manage their content at anytime and anywhere. Any creation, changes or modification of the content made by user automatically will be set offline will be review by the administrator before it can be publish to the system.

What will be unique about CMS is its flexibility and its knowledge based implementation. Not only the administrator have right to publish the contents but the normal user itself can do the same thing.

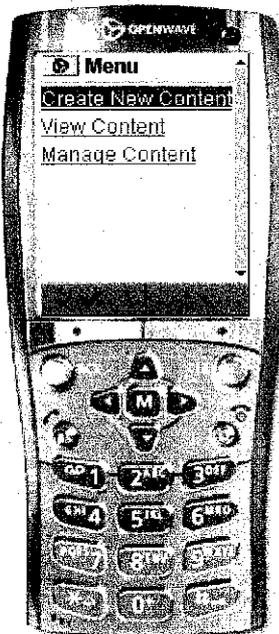
4.2 Screen Design

4.2.1 Screen Design for CMS on Mobile



This is the main page for the CMS on mobile. This page will provide user a brief description of CMS. After this page, user will be transfer to the main menu page

Figure 4.2.1.1: Welcome page for CMS



This is the main menu page for the CMS on mobile. There are three menus available including Create New Content, View Content and Manage Content. From this, user will be able to navigate to the selected menu and start using the system

Figure 4.2.1.2: Main menu page

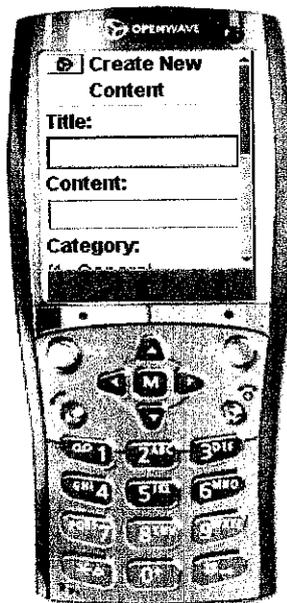


Figure 4.2.1.3: Create New Content Page

This is Create New Content page for the CMS on mobile. This page will allow user to create their contents such as announcement, events and so on. After fill in the information needed, they have to click on Submit button and it will display in the View Content page.

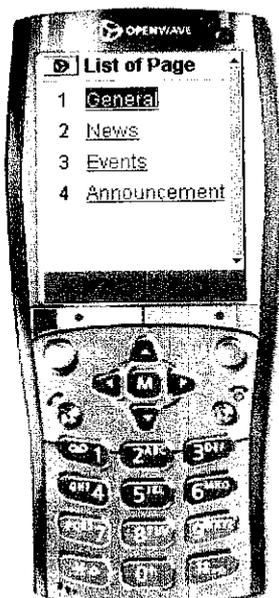


Figure 4.2.1.4: List of Content Page

This is List of Content page for the CMS on mobile. This page will list several categories including General, News, Events and Announcement. The CMS content will be published based on these categories.



Figure 4.2.1.5: List of News Page

This is the view page for the CMS on mobile. This page will allow user see the recent articles, announcement, events that had been posted. It will display based on the Title of the content. If user wishes to see the content, they can click on Details

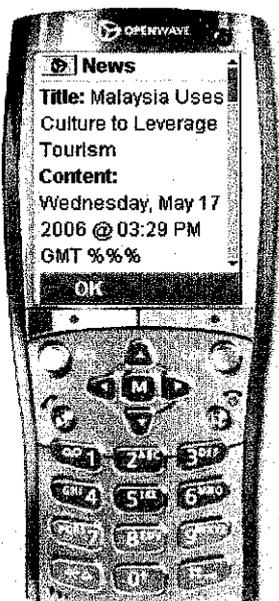


Figure 4.2.1.6: View Content Page

This is the View Content page for the CMS on mobile. This page will allow user see the content of title that has been selected including the date and by whom. Once user click OK, they will be transfer back to Main Menu page

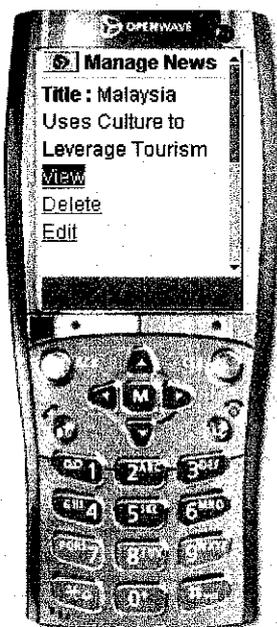


Figure 4.2.1.7: Manage Content Page

This is the Manage Content page that allow user to manage their content. User can view, edit and delete the content. Once user clicks on one of these selections, user will be transfer back to main menu page.

4.2.2 Screen Design for CMS on Website

If user login as Normal User:

MCulture

Login :
user

Password :

Remember me

ok

Figure 4.2.2.1: Login Page

At the login page, user will be able to login using own password. Each user has different password which allow them to create and manage own contents.

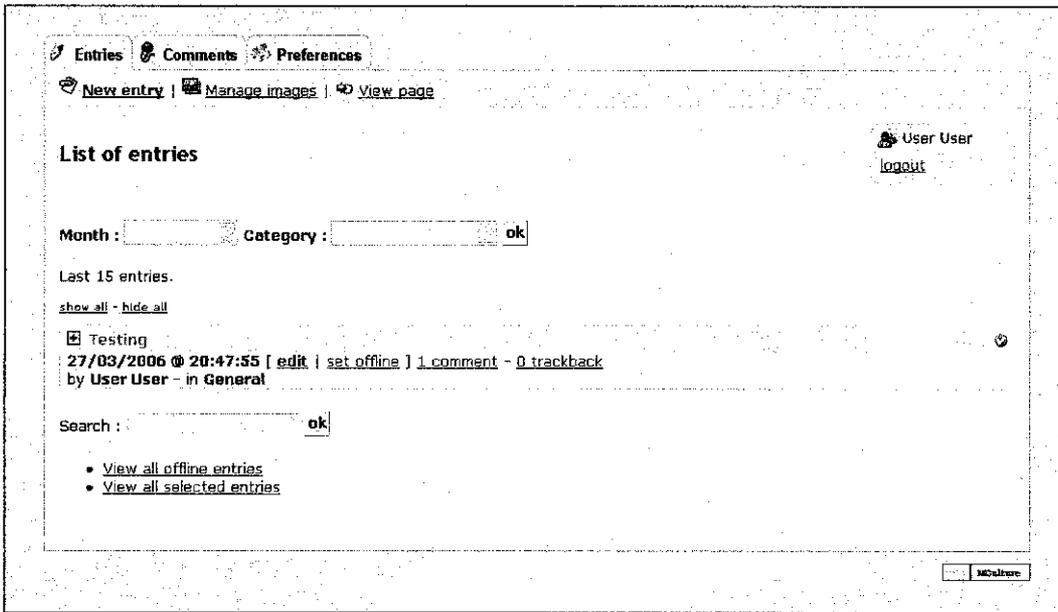


Figure 4.2.2.2: User Main Page

At user main page, it will allow user to see the recent articles, announcement or events posted by all the users. It also will show the date, time, by who and categories. From this, user will be able to edit contents, set offline and read the comment and trackback. In addition, there are other navigation page such as Entries (New Entry, Manage Images, View Page), Comments and Preferences. The list of entries also can be choosing based on month and categories. User will be able to search the contents which are available in this website.

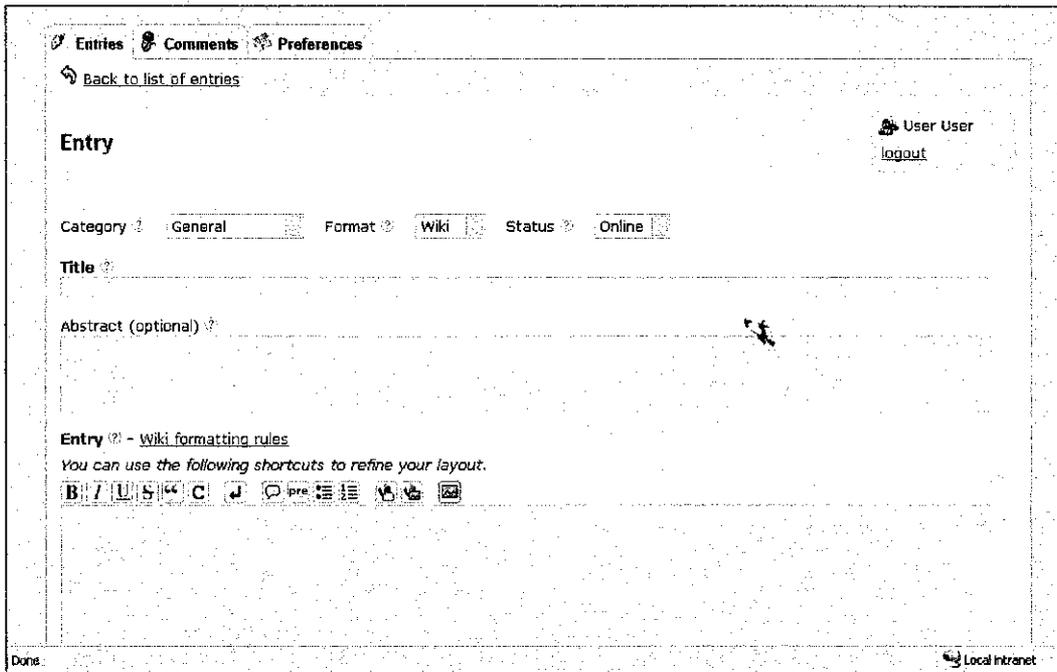


Figure 4.2.2.3: New Entry Page

At New Entry page, it will allow user to create content. The user has to fill in Title and the Entry which is the content. It also allow user to choose the category (General, Announcement, Events), format (Wiki or HTML) and the status to publish content (online or offline). Then user can either save whatever content that has been created or publish to the website.

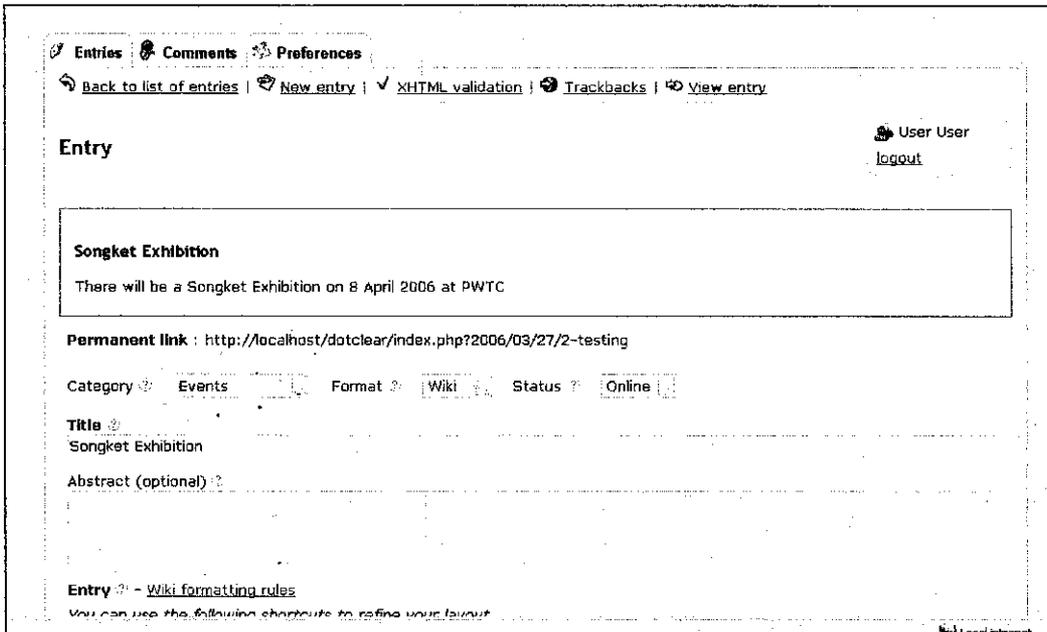


Figure 4.2.2.4: Edit Page

This Edit page allow user to edit or change whatever content that has been created by them. User also can navigate to other page such as New Entry Page, XHML Validation, Trackbacks and View Entry page.

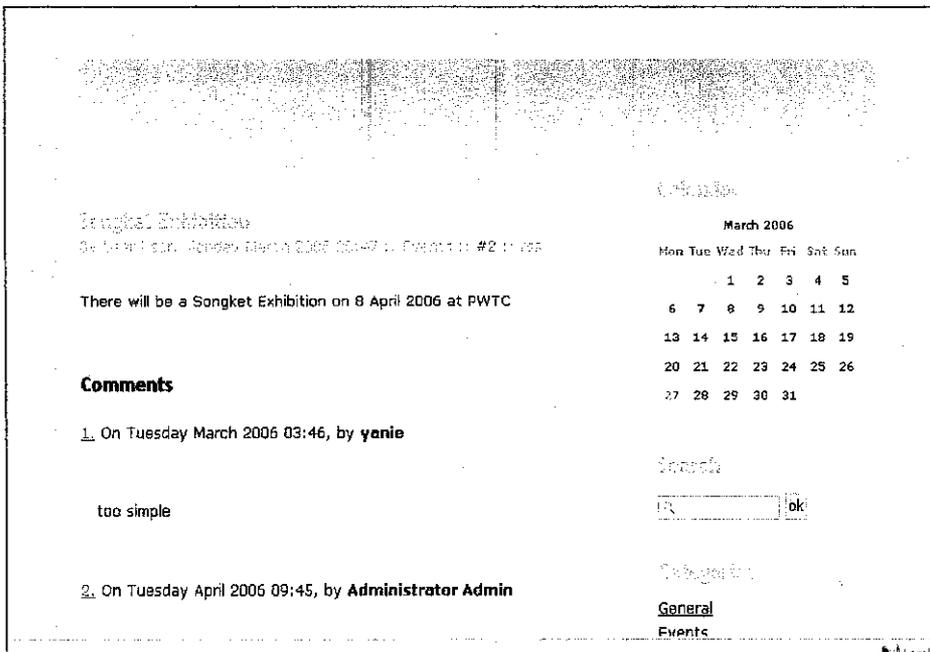


Figure 4.2.2.5: View Page

This is the View Page which is the MCulture page where it displays all the information and culture contents that has been created by all users. User can put the comments and trackbacks, search contents, view the contents by categories and so on.

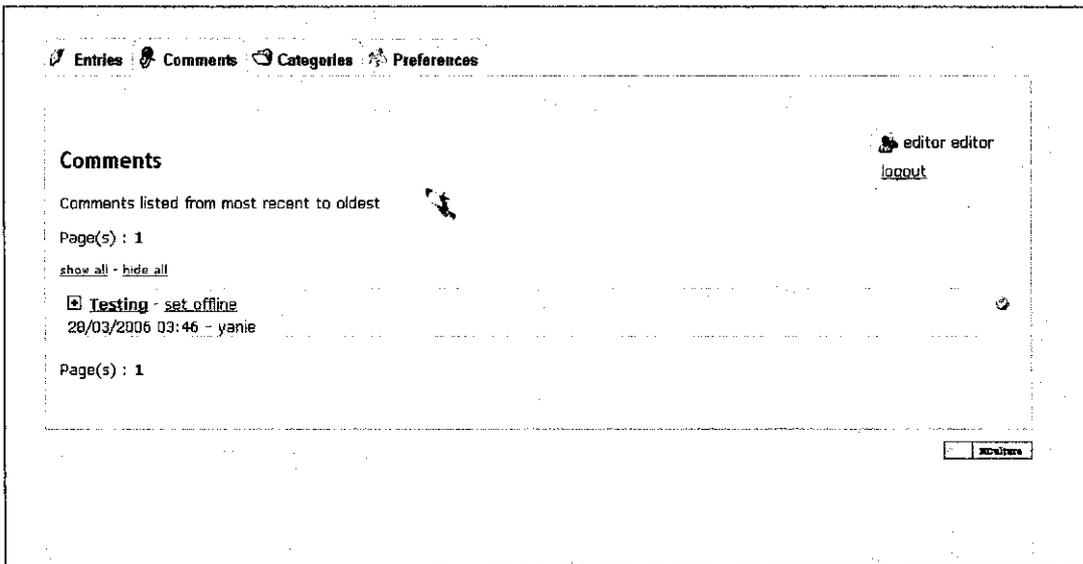


Figure 4.2.2.6: Comments Page

User can put the comment in the View Page. User can set whether to display the comment online or offline.

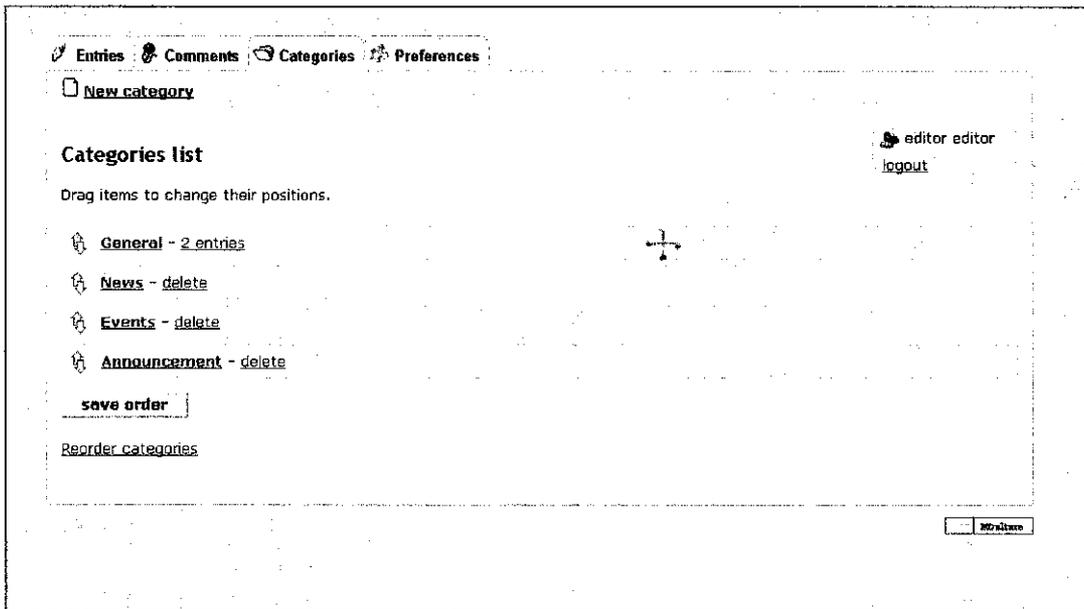


Figure 4.2.2.7: Categories List Page

At this page, user can add new category and manage categories (delete and reorder categories). Then user can click on Save button to apply changes.

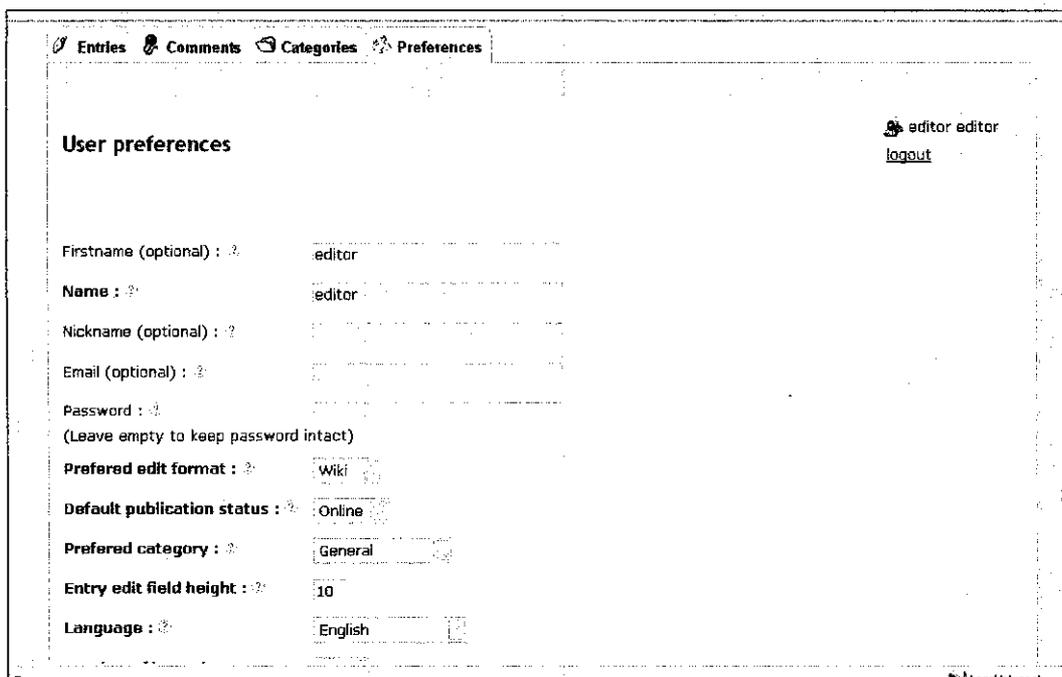


Figure 4.2.2.8: User Preferences Page

This page contains the user's data when they register to the system. They can change the data and click on Save button to apply changes.

If user login as Administrator, the pages are similar to the Normal User page except there are a few numbers of additional pages.

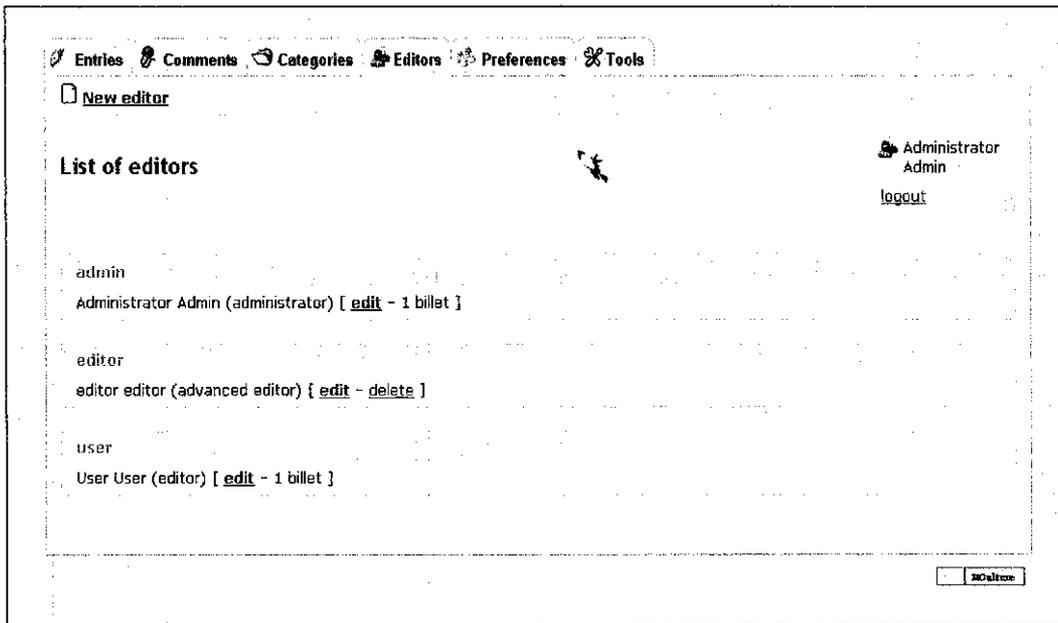


Figure 4.2.2.9: List of Editors Page

This page contains the list of editors where the admin can add new editors or manage the data for all editors such as Editor, User and so on.

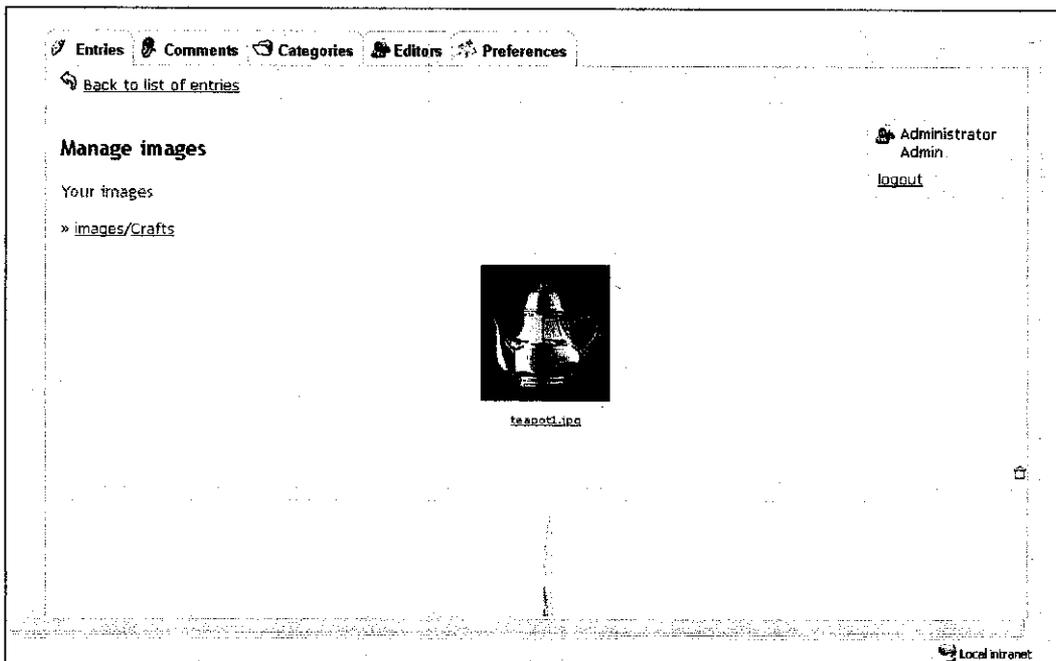
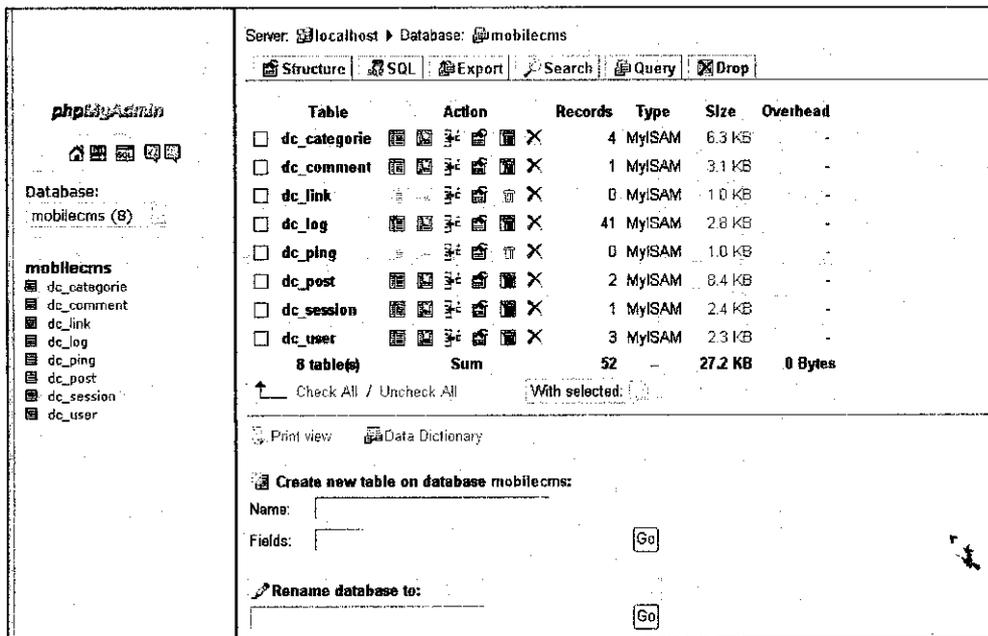


Figure 4.2.2.10: Manage Images Page

This is the Manage Image page where they can put the image or put it into different folder that has been created. User can also delete the image by clicking on the small dustbin at the right side of each image.

5.3 Database

Currently there is one database for CMS which is mobilecms. The database contains several tables including dc_categorie, dc_comment, dc_link, dc_log, dc_ping, dc-post, dc_session and dc_user.



The screenshot shows the phpMyAdmin interface for the 'mobilecms' database on a localhost server. The interface includes a sidebar with navigation options and a main table structure view. The table structure view lists the following tables:

Table	Action	Records	Type	Size	Overhead
<input type="checkbox"/> dc_categorie	[Icons]	4	MyISAM	6.3 KB	-
<input type="checkbox"/> dc_comment	[Icons]	1	MyISAM	3.1 KB	-
<input type="checkbox"/> dc_link	[Icons]	0	MyISAM	1.0 KB	-
<input type="checkbox"/> dc_log	[Icons]	41	MyISAM	2.8 KB	-
<input type="checkbox"/> dc_ping	[Icons]	0	MyISAM	1.0 KB	-
<input type="checkbox"/> dc_post	[Icons]	2	MyISAM	8.4 KB	-
<input type="checkbox"/> dc_session	[Icons]	1	MyISAM	2.4 KB	-
<input type="checkbox"/> dc_user	[Icons]	3	MyISAM	2.3 KB	-
8 table(s) Sum		52	-	27.2 KB	0 Bytes

Below the table structure view, there are options to 'Print view', 'Data Dictionary', 'Create new table on database mobilecms:', and 'Rename database to:'. The 'Create new table' section includes fields for 'Name:' and 'Fields:' with a 'Go' button. The 'Rename database to:' section includes a text input field and a 'Go' button.

Figure 4.3.1: Database for mobilecms

Server: localhost Database: mobilecms Table: dc_user

Structure Browse SQL Search Insert Export Operations Empty Drop

Field	Type	Attributes	Null	Default	Extra	Action
<input type="checkbox"/> user_id	varchar(32)	BINARY	No			    
<input type="checkbox"/> user_level	int(11)		No	0		    
<input type="checkbox"/> user_pwd	varchar(32)	BINARY	No			    
<input type="checkbox"/> user_nom	varchar(255)	BINARY	Yes	NULL		    
<input type="checkbox"/> user_prenom	varchar(255)	BINARY	Yes	NULL		    
<input type="checkbox"/> user_pseudo	varchar(255)	BINARY	Yes	NULL		    
<input type="checkbox"/> user_email	varchar(255)		Yes	NULL		    
<input type="checkbox"/> user_post_format	varchar(5)		No	wiki		    
<input type="checkbox"/> user_edit_size	int(11)		No	10		    
<input type="checkbox"/> user_pref_cat	int(11)		Yes	NULL		    
<input type="checkbox"/> user_lang	char(3)		Yes	NULL		    
<input type="checkbox"/> user_delta	int(1)		No	0		    
<input type="checkbox"/> user_post_pub	int(1)		No	0		    

↑ Check All / Uncheck All With selected:  

Print view Propose table structure

Add new field: 1 At End of Table At Beginning of Table After user_id Go

Indexes: Space usage: Row Statistics:

Local Intranet

Figure 4.3.2: User Table

Server: localhost Database: mobilecms Table: dc_post

Structure Browse SQL Search Insert Export Operations Empty Drop

Field	Type	Attributes	Null	Default	Extra	Action
<input type="checkbox"/> post_id	int(11)		No		auto_increment	    
<input type="checkbox"/> user_id	varchar(32)	BINARY	No			    
<input type="checkbox"/> cat_id	int(11)		Yes	NULL		    
<input type="checkbox"/> post_dt	datetime		Yes	NULL		    
<input type="checkbox"/> post_creadt	datetime		Yes	NULL		    
<input type="checkbox"/> post_updat	datetime		Yes	NULL		    
<input type="checkbox"/> post_titre	varchar(255)		Yes	NULL		    
<input type="checkbox"/> post_titre_uri	varchar(255)		Yes	NULL		    
<input type="checkbox"/> post_chapo	longtext		Yes	NULL		    
<input type="checkbox"/> post_chapo_wiki	longtext		Yes	NULL		    
<input type="checkbox"/> post_content	longtext		Yes	NULL		    
<input type="checkbox"/> post_content_wiki	longtext		Yes	NULL		    
<input type="checkbox"/> post_notes	longtext		Yes	NULL		    
<input type="checkbox"/> post_pub	int(1)		No	0		    
<input type="checkbox"/> post_selected	int(1)		No	0		    
<input type="checkbox"/> post_open_comment	int(1)		No	0		    
<input type="checkbox"/> post_open_fb	int(1)		No	0		    
<input type="checkbox"/> nb_comment	int(11)		No	0		    

Local Intranet

Figure 4.3.3: CMS Contents Table

4.4 Data Flow Diagram (DFD)

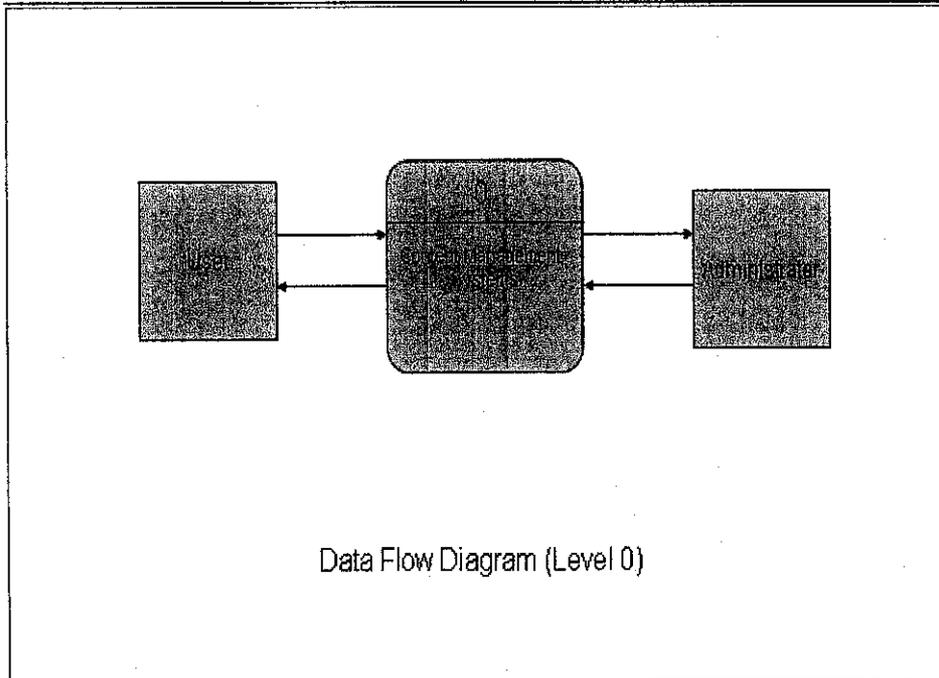


Figure 4.4.1: Data Flow Diagram (Level 0)

At level 0, this DFD shows that the user and the administrator interact with the Content Management System.

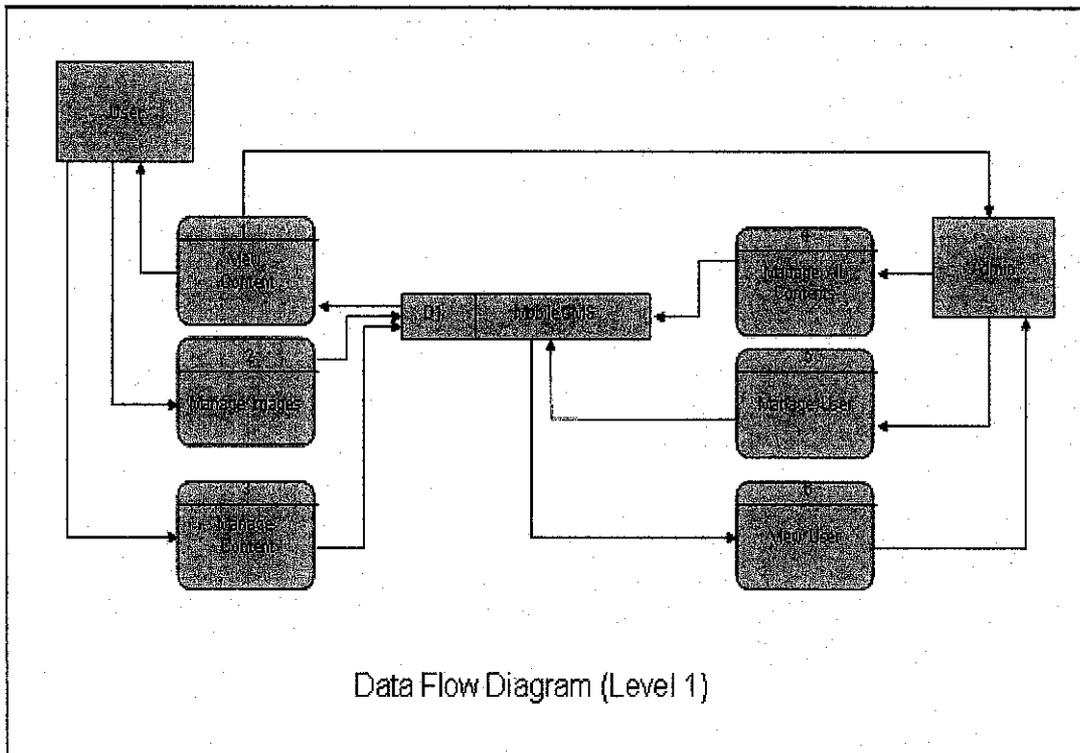


Figure 4.4.2: Data Flow Diagram (Level 1)

At level 1, DFD shows that the user interacts with the Content Management System more specific. User can view the content where it retrieved from the mobilecms database. The user can manage images contents and save it into mobilecms database. For admin, admin can view user data which is retrieved from the mobilecms database. Admin also can manage all contents and user and save changes into the mobilecms database.

4.5 Problem Encountered and the Possible Solution Suggested

The expected result from this project is not yet fully obtained. There are some parts that still not fully functioning such as Add, Edit and Delete contents part in emulator. The reason being is that there is a problem in connecting the coding with the database which is MySQL using Wap Proof Emulator. Thus, the author decided to use Openwave SDK as the Wap Emulator.

Furthermore, there are limited references for CMS using mobile devices and WML coding. It is hard to implement the basic coding from the Internet into author's system which is more complicated. In addition, the author understand with the concept of website because lack of exposure to the users about the concept and what is the CMS is all about, how it work and also the information and service that CMS is providing. Since there are also limited books available in the UTP library, the author have to refer more on the Internet which guiding me through the development the CMS for mobile devices.

Besides, it also hard to find the journals related to the author's project that can be use as reference. As a result, the author has some problem in predicting the flow, the development and outcome of the system. Thus, the author had to find other alternatives such as refer to the articles on the Internet, refer to the Web CMS journals etc to get a better view of the flow, development and outcome of the system.

CHAPTER 5

CONCLUSION AND RECOMMENDATION

5.1 Conclusion

CMS can be divided into 4 parts: creation, content management, publishing and presentation. This project can help the administrator manage the system easily with less work and task to handle the process of creating, publishing, and editing the information in the web at any time and anywhere. CMS can give opportunity to the user to share their information by the content creation process using mobile devices. This system is to be user-friendly where the users need to register and become a member to contribute and sharing information in the web. Then the user can submit the news, articles, events, images, music and movies regarding cultural information and publish it to the web. The system shall let users be alerted with all of the cultural news, notices, events, and information that have been published through mobile devices.

5.2 Further Development and Enhancement

There are several recommendation and suggestions that can be done in the future for the improvement of Content Management System (CMS) for mobile devices and system enhancement that the author has developed.

For the recommendation to the CMS future, CMS features and functionality should be more variety to ensure that CMS can satisfy the user need in easy way and without too much complicated efforts. The accuracy in creating the content and share the knowledge should be in the best condition with accurate information and fast response time provided by CMS.

Good interaction between the users and the CMS has provided a good user friendly to the users. This will lead to the satisfaction of users while using the system because users need something that does not have to do with much effort in using the CMS. In the other hand, the retrieving, creating, editing, and publishing process of content should be interactive, user friendly, and need just little time to settle it. In the near future, there is no more redundancy of information, low cost to maintain the system, and all the process will be at fingertips.

For the recommendation of system enhancement, the content of the system should be in wide scope with a lot of information and knowledge in the system to ensure the system is useful, thus ease the users to create content and sharing the knowledge.

In addition, the system should be fully integrated with WAP. Currently, the author is using WAP hosting which is Geocities in order to integrate with CMS. Unfortunately, the system will be display only a few pages that is not connected to the database. In order to integrate the whole system with WAP, the author has to use paid plan.

The administrator should be able to manage the users' content and control publishing process using mobile devices. The reason being is that the administrator can only manage users' content and control publishing process through website. It will be easy for the administrator to do their task at anytime and anywhere if they are using mobile devices.

The user interface that have been applied in the mobile need to be more interactive and attract the users to use the system. Users need to ease in reading the information provided in the system.

There is also need some improvements in the interactivity with the system by providing good images, attractive colors and navigation, and also well structured and organized content that have been published in the system along with standardized form for the users to create the content.

REFERENCES

1. Robertson, J. (January 2002), *How to Evaluate a Content Management System*, KM Column, Knowledge management consultancy. Retrieved from the World Wide Web: <http://www.steptwo.com.au>.
2. Paul, B & Mike, L , *Content Management Systems*,
3. Hall, B. (2001) *New technology definitions*. Online glossary
4. Robertson, J. (November 2003), *Choosing the Right CMS Authoring Tools*, KM Column, Knowledge management consultancy. Retrieved from the World Wide Web: <http://www.steptwo.com.au>
3. Robertson, J. (January 2003), *Why Every Small Website Needs A Content Management System*, CM Briefing. Retrieved from the World Wide Web: <http://www.steptwo.com.au>
4. Hall, R (2005), *Storing Web Content in the Database*. Retrieved from the World Wide Web: [http:// www.oracle.com](http://www.oracle.com)
5. Sun Microsystems, (2004), *Sun Java System Portal Server Mobile Access*

Clare Rogers and John Killiemuir. "Developing a Content Management System-based Web Site" in D-Lib Magazine, 2003

Antti Sorvari, Janne Jalkanen, Riitta Jokela, Alastair Black, Kimmo Koli1, Marko Moberg, Turkka Keinonen, "Usability Issues in Utilizing Context Metadata in Content Management of Mobile Devices". 2004

Bob Boiko. *Content Management Bible*, Indianapolis, Wiley Publishing, Inc. 2005