Validation Tool for E-government in Malaysia
Based on MAMPU Guidelines

By

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CERTIFICATION OF APPROVAL

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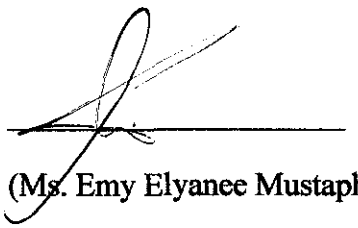
Approved by,



(Ms. Emy Elyanee Mustapha)

UNIVERSITI TEKNOLOGI PETRONAS

TRONOH, PERAK

JANUARY 2009

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.

MOHD FARIS BIN ABDUL WAHAB

ABSTRACT

Malaysian government has introduced MAMPU guidelines to the government agencies which it is used as the main guiding principle in developing and maintaining their websites. All government agencies websites must compliances with MAMPU guidelines. A validation tool was created to validate whether the website is compliance or not with the guidelines. However, previous validation tool only check the compulsory criteria of the MAMPU guidelines. It also does not provide any suggestion for each error after validating the website. This project is to enhance that validation tool by adding the additional criteria and to validate government websites (Ministry of Education Malaysia and Minister of Culture, Arts and Tourism Malaysia) using the developed validation tool against human validation. Human evaluation process consists of a set of instructions based on the specific task scenario. The project will append the additional criteria (6.3.2 a, 6.3.2 b) on the MAMPU guidelines which provide supported link such as help, trouble shooting and guidelines on how to interact with the website and also provide some useful video or audio which are related to the agency's services. Methodology used in developing and enhancing current validation tool is prototyping-based methodology. Analysis, design and implementation are performed repeatedly. The result will be a new validation tool which consists of both compulsory and additional criteria based on MAMPU guidelines and also the alternative ways to check the website instead of key in the URL. Finally, this project is hoped to assist government in improving Malaysia's position in World E-Government ranking as well as save cost, time and effort in validating each website.

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CHAPTER 1

INTRODUCTION

1.1 BACKGROUND OF STUDY

Objective of MAMPU guidelines is to inform the implementation of myGovernment portal, focus on the importance of managing public sector's website and as a guideline in developing and maintaining public sector's website [1]. A validation tool based on MAMPU guidelines has been developed before by other developer.

The validation tool validates the website based on compulsory criteria in the guidelines. It is able to check any broken link on the website. In that guideline, those compulsory criteria must be met by every government agencies website. There are also an additional criteria being stated which is an optional. Combination of both compulsory and additional criteria can improve the quality of the website.

Below are the compulsory criteria which have been validated by the previous validator:

i. Clearly declare the Official Portal/Web Site
ii. Displaying the Malaysia Government Crest at least at the front page or other pages.
iii. Placing the Agency's official logo if exists.
iv. Introducing the agency.
v. Displaying the agency's policy.
vi. Displaying the agency's Client's Charter
vii. Stating the services provided by agency.
viii. Include the contact info (phone number, facsimile, address and email address). The condition is, the email addresses must be in static state and not in hyperlink state to prevent spamming.
ix. Include the Frequency Asked Question (FAQ) about the agency.

x. Include the Disclaimer.

xi. Include the Privacy Policy

xii. Include the Security Policy.

xiii. Include the Copyright Notice.

xiv. Include services where visitors can ask inquiries, give feedbacks, comments and suggestions. Reply must be within 3 working days.

xv. Auto expires for information that has expiry date.

xvi. Include downloading of files, forms, video/audio clips, and others services.

xvii. Including the search engine service.

xviii. At least in two languages, English and Bahasa Malaysia. Other languages are optional whichever suits.

xix. Link myGovernment website from the agency's website with myGovernment Logo and link to other agencies within the ministry.

xx. Include MSC logo for MSC involved agencies.

xxi. Include Sitemap for the website.

xxii. Using the ".gov.my" domain.

The previous developer, Hilman, ex-student of University Teknologi PETRONAS already developed validation tool for the compulsory criteria in the MAMPU guidelines. He used PHP, mySQL and Apache in developing the web validator. The validator checks the website by comparing the word in that website with the word he had declared for each criteria as the key word in the database. However, in using this method, there are some limitations such as it cannot compare picture with the word. Same picture not necessary has the same name. Hence, in this case, human validation is also required.

1.2 PROBLEM STATEMENT

In the MAMPU guidelines, it consists of compulsory and additional criteria for the government websites. Government website should not only fulfill compulsory part. It should be built and present it the best form because it acts as the intermediary between government and citizen. It can give good or bad impression about the government to the user (citizen) depending on that particular website. If the user finds out some difficulty in navigating the website, they may feel that the government just wants the website to be there and does not concern about the user.

Current validation tool developed by the previous developer is focus on the compulsory criteria only. The additional criteria and specification are not being validated. The additional criteria listed in the MAMPU guidelines are provide help, troubleshooting and guideline. Refer to the above case; all the additional criteria are very helpful to increase the website accessibility and usability.

Current validator also does not provide any suggestion after validating the website. It only lists the errors in that website. The suggestion is essential to let them know what is the best way to solve the error.

Furthermore, user can only key in the Uniform Resource Locator (URL) of the website they want to validate. It does not provide any alternative for the user as other validation tools such as the upload file and copy/paste HTML. These two options are very useful for offline version websites. They may want to validate the website first before going online.

E-government in Malaysia does not has any website evaluator to validate e-government websites whether it compliance or not with both criteria in the MAMPU guidelines. Human validation process consumes a lot of time and cost. Government websites also lack of credibility which may reduce the willingness of the citizens to use their websites.

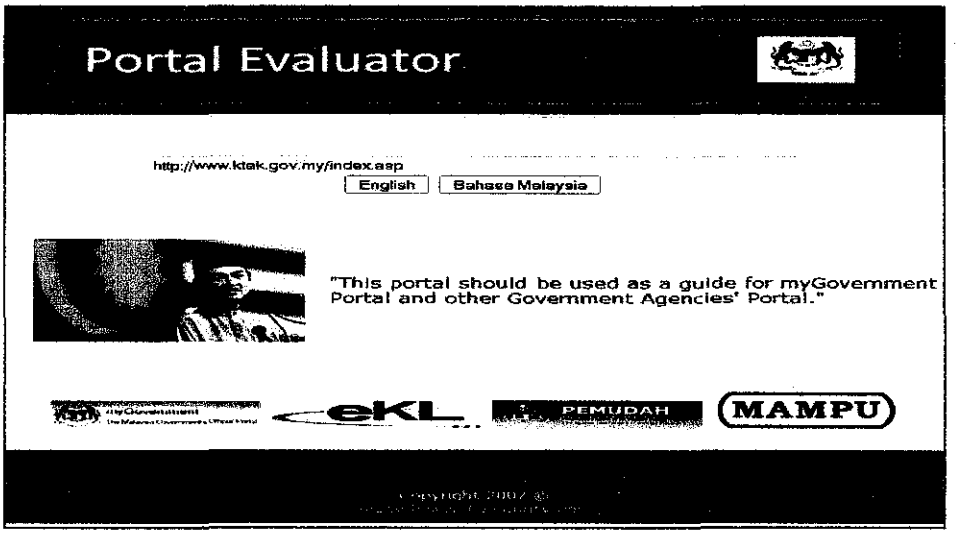


Figure 1.1 Previous Validator Interface

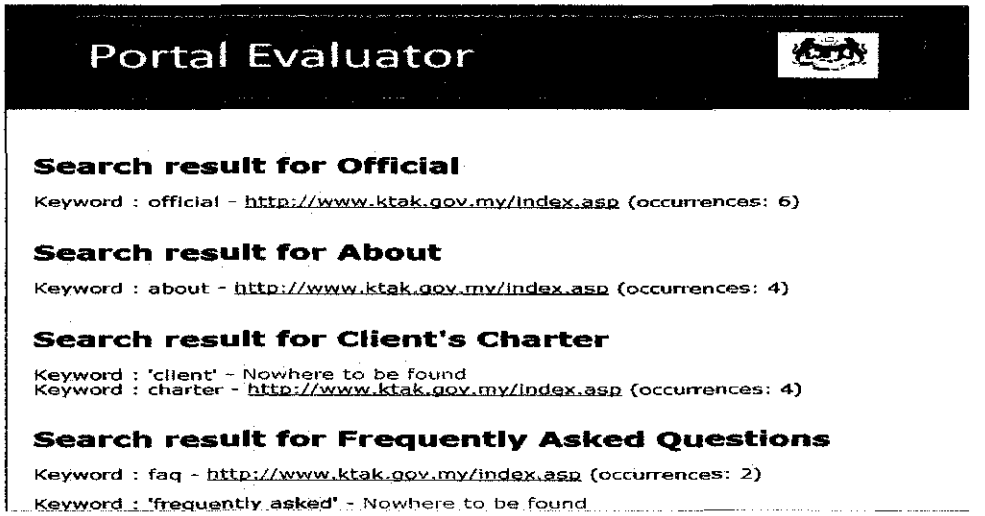


Figure 1.2 Previous Sample Result

1.3 OBJECTIVES AND SCOPE OF STUDY

1.3.1 Objective

This project has two objectives which are:

i. To enhance a validation tool developed based on MAMPU guidelines which consist of the additional criteria (6.3.2 a, 6.3.2 b) from the MAMPU guidelines. Firstly, able to check whether the website provides supported link such as help, trouble shooting and guidelines on how to interact with the website. Second, able to check whether the website provides some useful video or audio which are related to the agency's services or activities.

ii. To validate government websites (Ministry of Education Malaysia and Minister of Culture, Arts and Tourism Malaysia) using the developed validation tool against human validation.

1.3.2 Scope of Study

The project basically is to improve the current validation tool developed by previous developer. Since the developer only focus on the compulsory criteria, this project will append to the additional criteria (6.3.2 a, 6.3.2 b) on the MAMPU guidelines which are as follows:

i. Provide supported link such as help, trouble shooting and guidelines on how to interact with the website.
ii. Provide some useful video or audio which are related to the agency's services.

The new validator should be able to validate the website based on the compulsory and additional criteria in the MAMPU guidelines. It will also offer the alternative ways to validate the website which are check using the URL, upload file or copy/paste HTML.

CHAPTER 2

LITERATURE REVIEW

2.1 MAMPU Guidelines

Malaysian Administrative Modernisation and Management Planning Unit generally known as MAMPU is the main governing body in Malaysia. MAMPU's vision is to be the change leader of excellence and distinction for the Malaysian Public Service and their mission is to continuously modernise the Malaysian Public Service in achieving a high level of quality [1]. The objective of MAMPU is to enhance the quality, efficiency, effectiveness and integrity of the Malaysian Civile Service. [1] It handled the functions of administrative modernisation and human resources planning. Below is their vision [1]:

i. Quality Generates Integrity
ii. Together We Lead MAMPU to the highest level of excellence
iii. Changes begin from within ourselves
iv. Knowledge Worker Make Organisation Excellence

The objectives of Malaysian Government introducing MAMPU guidelines are as followed [2]:

i. To notify the concept and the used of myGovernment as the information center for public sector.
ii. To inform the management of websites for public sector and their agencies.
iii. To provide the guidelines for public sector and their agencies in developing and maintaining their websites.

By understanding MAMPU guidelines, it helps the author understand better what he should accomplish. It is the first thing author must study before developing the validation tool to get the idea what it is all about.

2.2 Validation Tools

Many validation tools are available on the internet. Most commonly used one is located on the W3C website. To check the website, user only has to key in the URL of the website. This validator will validate the website and informs of any syntax error existing to the user [3]. Validator not the one that will be doing the correction for that file but it has to be made by the website programmer itself. Example of validation tools available are W3C XHTML Validator, W3C CSS Validator, WDG HTML Validator, RSS Feed Validator, Userland RSS Validator, RSS 1.0 (RDF) Validator, WML Validator, Robots.txt Validator and W3C Link Checker. There is a tip on validating the referring URL provided by WDG. Refer on the **Appendix 1**.

Markup Validation Service by W3C

This validation tool is provided by the W3C for free. It checks the markup validity of Web documents in HTML, XHTML, SMIL, MathML, etc [4].

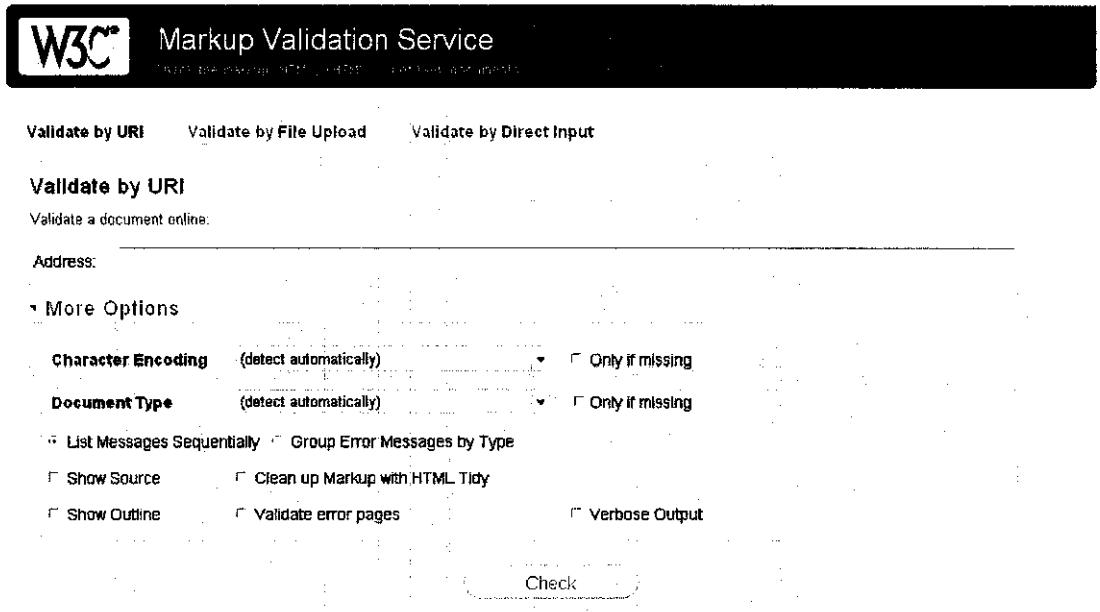


Figure 2.1 W3C Markup Validation Service Interface

Result:

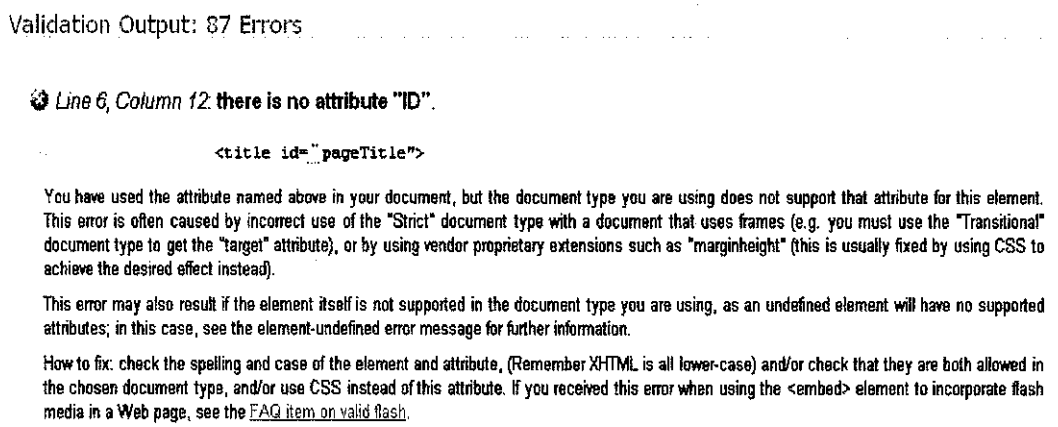


Figure 2.2 W3C Markup Validation Service Result

W3C Markup Validation Service provides user with three ways to validate the page. User can simply type the URL of that page in text provided text field, validate using "File Upload" link if user have local file to validate or user can also copy and paste the complete markup (including a DOCTYPE declaration) for a document in the "direct input" box [5].

Below is how this validator works:

i. The W3C Markup Validation Service is a web gateway to a well known SGML parser called SP. SP will take your HTML and compare it to a set of objective syntax rules called a "DTD", a Document Type Definition. This way you can be sure your HTML is really valid and not just that it conforms to some random programmer's idea of "nice" HTML [5].

ii. When you send an URL to the W3C Markup Validation Service, it will fetch that URL and feed it to the SGML parser. If you upload a file it'll get fed directly into the SGML parser. It then takes the output from the SGML parser and formats it nicely as HTML and sends it back to your web browser [5].

iii. The W3C Markup Validation Service is not generating the error messages - they are all generated by the underlying Parser - but it is appending short explanations and suggested fixes for each error [5].

Validate error pages (no200) is one of the option that can alter the behaviour of the W3C validator. The Markup Validator will usually tell you if the page you tried to validate could not be retrieved (for example, if the server gave a "404 not found" message. In some circumstances you may want to be able to validate the error page sent by the server. This is the option to use then [5].

Interpreting the validator's error messages is not that easy. The error messages are generated in the context of a full SGML environment which demands a somewhat higher level of technical detail than average HTML document. We have set up a page listing errors and their explanation, which should help you find out what meaning lies behind the cryptic messages, and fix your markup [5].

Here is the answer on how to include flash in valid (X) HTML Web pages. "Many Flash authoring tools recommend, or enforce, the usage of the <embed> element to include flash animations or applications in Web pages. <embed>, however, was never part of any standardized version of HTML, and this practice produces invalid markup. There are many techniques to incorporate flash in valid web pages. One of the most famous is the Flash Satay technique." [5]

WAVE Version 4.0

WAVE 4.0 also provided for free by the WebAIM. The advantage of using WAVE 4.0 is that rather than providing a complex technical report, it shows the original web page with error message within the page [6]. It makes user easier to find where the errors are. Refer to **Figure 2.4**.The drawback of this validation tool is user cannot choose features they want to check.

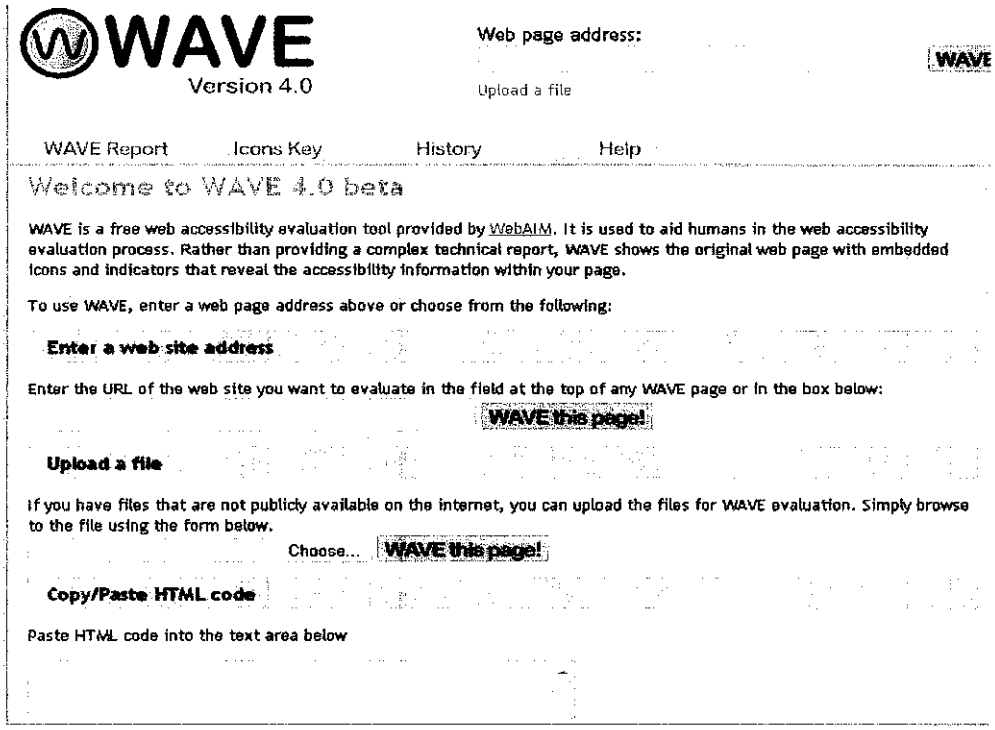


Figure 2.3 WAVE 4.0 Interface

Result:

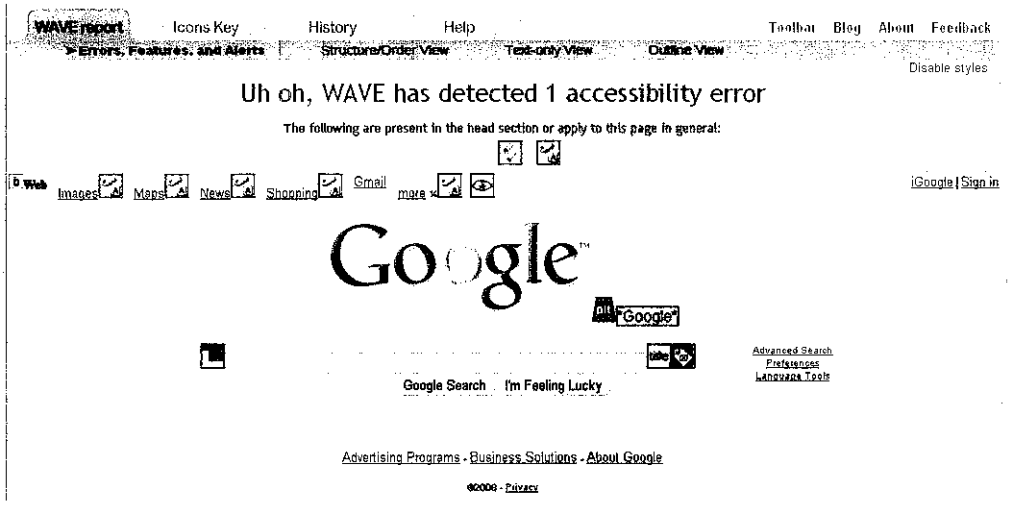


Figure 2.4 WAVE 4.0 Result

Rather than relying on complex tests and if/else statements, a simple, XML-based language is used for writing evaluation rules. This allows easy creation and modification of evaluation rules, icons, and reporting features [7].

Truwex Online 2.0

Truwex Online 2.0 is not provided for free. The one that is available on the internet is the trial version. If someone wants to use this software, it cost $390 [8].

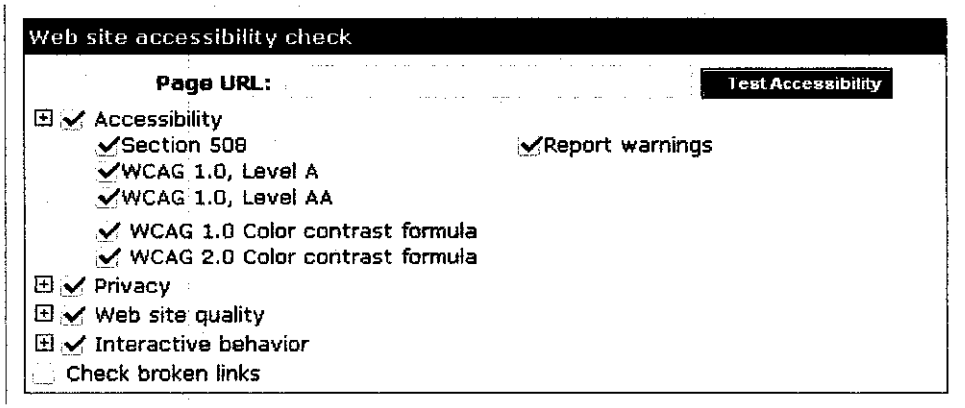
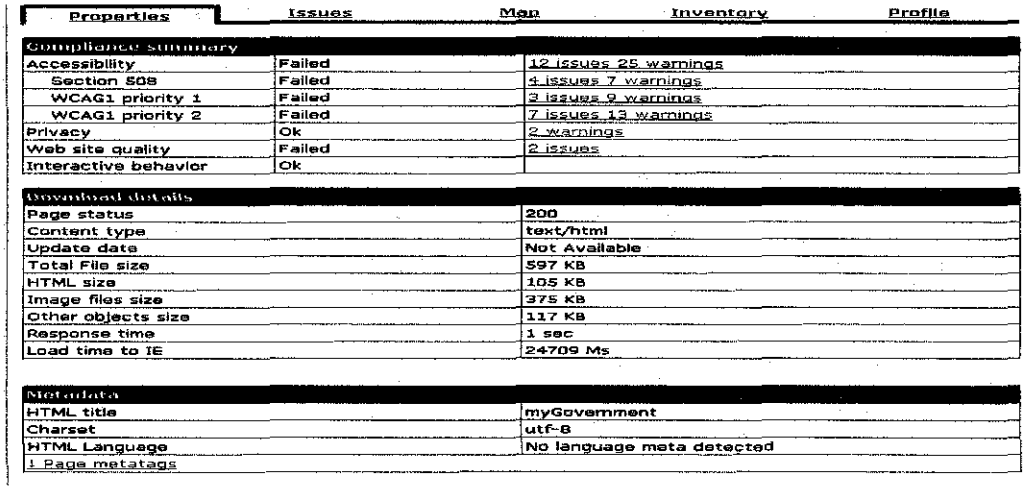


Figure 2.5 Truwex Online 2.0 Interface

Using Truwex Online 2.0, user can select what kind of validation they want. User can easily check or uncheck any criteria to be validated. It enable user to [8]:

i. Automatically test new web pages against a required web standard.
ii. Detect issues on a website and use detailed Truwex diagnostics to fix them.

Result:



Properties | Issues | Map | Inventory | Profile

Compliance summary		
Accessibility	Failed	12 issues 25 warnings
Section 508	Failed	4 issues 7 warnings
WCAG1 priority 1	Failed	3 issues 9 warnings
WCAG1 priority 2	Failed	7 issues 13 warnings
Privacy	Ok	2 warnings
Web site quality	Failed	2 issues
Interactive behavior	Ok	

Download details	
Page status	200
Content type	text/html
Update date	Not Available
Total File size	597 KB
HTML size	105 KB
Image files size	375 KB
Other objects size	117 KB
Response time	1 sec
Load time to IE	24709 Ms

Metadata	
HTML title	myGovernment
Charset	utf-8
HTML Language	No language meta detected
1 Page metatags	

Figure 2.6 Truwex Online 2.0 Result

These validators assist the author to visualize how he wants to update the current validator. They illustrate what the validator do, what are the attributes of the validators, the interface, how they validate website, and also the price for each different validators. All this factors are very important in determining the characteristic for the new validator and how it will be functioning.

2.3 Validator Criticism

All mark-up validators suffer from an inability to see the "big picture" on a web page. However they excel at picking up missed closing tags and other technicalities. This does not mean that the page will display as the author intended in all browsers. Even if validated, all web pages should be tested in as many different browsers as possible to ensure that the limitations of the validator are compensated for and that the page works correctly [5]. Some of the major browsers ignore certain types of errors and display the webpage successfully [5].

The validation tool which the author has built is capable to be viewed from almost all major web browsers. For instance, Mozilla Firefox, Opera, Internet Explorer and Google Chrome. It appears exactly like what it should be.

2.4 E-Government in Malaysia

Implementation of e-government in Malaysia started on 1997, a year after the initiation of Multimedia Super Corridor (MSC). E-government, which has been proposed as one solution, "refers to the delivery of [government] information and services online via the Internet or other digital means," and may also include opportunities for online political participation [9]. It can improve communication between citizens and government through email, enabling more direct participation in government decision-making [10].

The implementation of it has transformed the way government operates, modernizing and enhancing its service. It allows citizens to interact with the government anywhere and anytime. The main goals of e-Government are to improve the quality of public services and the efficiency of administrative work [11]. One of the advantages of implementing e-government is it enhance the convenience, accessibility and quality of interactions with the public and businesses at large [11].

The success and acceptance of e-government in Malaysia depends on:

i. *Citizen's willingness.* It means that the determination of the citizen to adopt and utilize the available services
ii. *Capability & self-confidence of citizens.* It refer to the capability and self-confidence in performing e-transaction
iii. *Trust.* This one refer to the protection of their personal data within an open & accountable government
iv. *Unfamiliarity with ICT.* Not all citizens are IT literate
v. *Lack of access.* The site is always down and never update
vi. *Lack of training.* They do not know how to use the website and there is no guideline for them to follow
vii. *End-user or demand-driven service.* E-government may provide ease & convenience in the delivery of public services and offer innovative government service to citizens.
viii. *E-government challenges existing ways of working*
ix. *E-government requires leadership*

x. *Cooperation between government, private sector & e-government coordinators*

xi. *Monitoring & evaluation are essential to effective e-government*

Karen Evans, the White House official in charge of e-government efforts once said "validates that the direction that we're going in is the right direction. We recognize that every person wants to deal with their government in the medium that they feel comfortable with."

There are also some challenges in implementing e-government. One of it is nature of services provided by state including environmental social, cultural, educational and consumer issues. Many people prefer to contact the government using the traditional way because they feel it is much easier. It is difficult to change the way people work. Obstacles which are often repeated every time the website goes through an upgrade doesn't help improve the experience on the user level. Thus, we ignore its existence and continue to face the crowds and visit the related offices to accomplish our errands [12].

Beside that, people are not confidence in the e-government due to the possibilities of breach of security, theft of personal information and error in transaction. In other words, lack of trust [11]. Malaysia once has been ranked top 5 of the world's malware distribution site, below Russia, United States and China, and above Korea [23]. There are some critics on the government website by the citizens. They claim that it has browser incompatibility, unnecessary flash media usage, formal jargon written content which some people might not understand, forced browser resize, uninvited popup windows, no direction information highway, bad color contrast and it also has distracting animated elements [12].

Citizen attitudes about government, including trust, are core concerns for democratic governance [13]. According to Miller and Listhaug (1990, 358 cf. Levi and Stoker 2000), trust in government is an evaluation of "whether or not political authorities and institutions are performing in accordance with normative expectations held by the public." [13] Traditionally, scholars have conceptualized trust as a product of citizen preferences regarding outcomes (either policy or

electoral outcomes), but recent research provides evidence that citizens base their evaluations on process considerations as well – how fair, open, and responsive political and governmental processes are [14, 15, 16].

Sometimes, in certain cases, the sites that are controlled by the government may contain inaccurate and misleading information. For this reason, the web designers faced increasing demands to boost the credibility of the sites [17]. Research has been done on credibility of the Malaysian states e-government web sites. The research involved five state government websites which are Melaka, Selangor, Johor, Sarawak and Kedah. Among all the five websites, the Kedah homepage is the most impressive in terms of credibility. The site is also comprehensive and presentable. All the icons together with the menu have been carefully designed. This factor is vital towards site credibility. The professional look and sleek design of the site element such as button and images is another contributor towards site credibility. However, in the hyperlinks section, too many links were listed, making the list look too cluttered [18].

Despite all the challenges, key to e-Government's success in Malaysia is the continuous improvement process [11]. Below are the solutions suggested to solve the problems [11]:

i. Increase the awareness of e-government application by publishing and advertising so that everybody knows about the e-services provided by the government.
ii. Increase the level of security by constantly maintaining the server few times in a month.
iii. Provide more efficient user manual guide on how to use the e-government application by setting up help desk enquiries via email or call.

Here are some of the Malaysian e-government successful applications [19]:

i. Government's drive for e-government services
ii. Electronic Labour Exchange (www.elx.gov.my) has matched 75,000 potential employees with employers since 2005.
iii. SMS alert on e-government services

iv. Online renewal of driving licenses
v. Electronic filing of income tax forms
vi. Voter information
vii. Details for government tenders
viii. Employment opportunities

According to The 5th Waseda University World ranking on E-Government 2009, Malaysia is on rank 22 with the score 63.38. The rank was drop from rank 18 in 2008. 34 countries are use as the sampling unit for the research [20]. The top three are Singapore, United States and Sweden. Research method can be found on **Appendix 2**.

It is a challenge to the government to promote and improve the government agencies websites in order to provide better services to the citizens. The validator can help through standardizing all the government agencies websites and make it compliance with the MAMPU guidelines.

2.5 Human Validation

Human validation is the alternative way to check the website without requiring the use or purchase of additional software. Manual validation techniques is simple and cheap but yet effective. The problem is that it requires person effort to do validation one by one. It also takes a lot of time to finish the validation. Here is one of the techniques a skilled designer can inspect many aspects of a web page without viewing the code [21].

i. Inspect the page with image viewing turned off
ii. View the page with the style sheet disconnected
iii. Turn your mouse upside down and navigate the page
iv. Print your page using a black and white printer

These techniques don't inspect a page for all of the accessibility issues that could arise. However, they work well for common mistakes such as omitted alternative representation text [21].

Below are the details regarding the above steps:

i. Inspect the page with image viewing turned off

The purpose for disabling browser image viewing is to quickly identify whether images have been marked with alt-text. When image viewing is disabled, all images are displayed with a placeholder. If the designer has assigned alt-text, that text is also displayed in the placeholder. This method is a quick way to gather an idea of images that are missing alt-text. The process to disable image viewing is a bit different across browsers. The directions in this section are applicable to Internet Explorer 5.x [21].

Internet Explorer 5.x

i. Select Tools from the menu bar. Choose Internet Options.
ii. Click the option tab labeled as Advanced
iii. Locate the category titled as Multimedia. Deselect the Show Pictures option.
iv. Select the button labeled as Apply. Click the button labeled as OK.

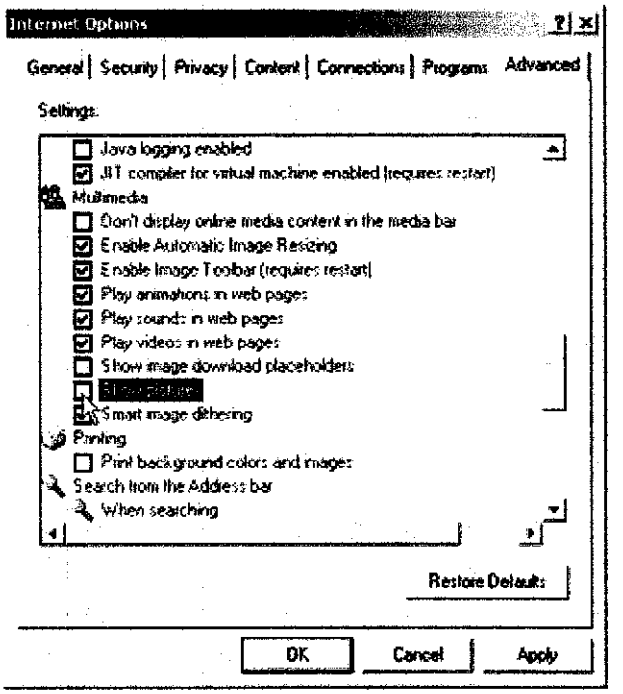


Figure 2.7 Turn off the image

ii. View the page with the style sheet disconnected

Standard D requires that all web pages that use style sheets are readable without the style sheet. Readability of a web page without a style sheet is very easy to test if the web page uses an external style sheet. You need only to temporarily break the link that connects the web page to the style sheet [21].

i. Locate the style sheet in your computer's directory.
ii. Temporarily change the name of the stylesheet file.
iii. Load the web page in your browser and inspect its readability.

Be sure to change the filename of the stylesheet back to its original name within your computer's directory.

Note: Change the stylesheet file name from outside of your web editing software. Most web editing software will change the code that refers to the stylesheet if the filename is changed. This will negate the change in the name suggested in the steps.

iii. Turn your mouse upside down and navigate the page

If you have never used this technique, it may be a challenge [21].

i. Place your insertion point in the URL line of your web browser. (Use your mouse if you need to do this step.)
ii. Press the tab key. Locate the destination of this action. Your browser will navigate from the URL line to the first hyperlink or form field on the page. Look for a small gray outline around an image or hyperlink. If there are form fields, look for the flashing cursor.
iii. Continue pressing the tab key. Can you access all of the links and the form field elements without using the mouse?

iv. Print your Web Page to a Black and White Printer

This is a good way to test contrast of colors among other things [21]. It also helps the websites developers to check the readability of their websites.

2.6 Web Accessibility

Web accessibility means that people with disabilities can use the Web. More specifically, Web accessibility means that people with disabilities can perceive, understand, navigate, and interact with the Web, and that they can contribute to the Web [22]. Web accessibility also benefits others, including older people with changing abilities due to aging [22].

Accessibility barriers make it difficult or impossible for many people with disabilities to use the Web. With increasing the accessibility of the website, it can help to increase the participation of both normal and disabilities citizen.

"A key principle of Web accessibility is designing Web sites and software that are flexible to meet different user needs, preferences, and situations. This flexibility also benefits people without disabilities in certain situations, such as people using a slow Internet connection, people with "temporary disabilities" such as a broken arm, and people with changing abilities due to aging. With that, it can give equal access and equal opportunity to people with disabilities and offers the possibility of unprecedented access to information and interaction for many people with disabilities." [22]

Malaysia's e-Government is the initiative aimed to enhance the convenience and accessibility of interactions between government and citizens, and between government and businesses [25].Many efforts have been made to enhance the delivery of the information and services on e-government. However, there are some factors which make it difficult to be fully utilized by the citizen. One of it is unequal accessibility and affordability of computers and Internet services. This is the fundamental communication media between government and citizen on e-government. Those who do not have computer or the internet cannot enjoy those government services.

"According to the survey sample, 80.3 percent of ministries' staff had access to Internet. At department level, 13 percent had no access and 4 percent of departments were still without Internet access. With regard to websites, all 28 ministries have a website. However, the stages of development among the 28 websites vary. 85.9 percent of departments within ministries have an official website. Among departments without a website, 10 percent were planning to have it and less than 2 percent had no plan to develop a website." [25]

Table 2.1 below examined staff's general perceptions of Malaysia's e-government prospects [25].

Table 2.1 Priority of E-Government

In your opinion, how high of a priority is your ministry/department's commitment to e-government?		
	No	%
Of a highest priority	13	18.3
Of a high priority	37	52.1
Of a moderate priority	16	22.5
Don't know	5	7.0
Total	71	100.0

CHAPTER 3

METHODOLOGY/PROJECT WORK

3.1 Methodology

A prototyping-based methodology performs the analysis, design and implementation phase concurrently, and all three phases are performed repeatedly in cycle until the system is completed [24].

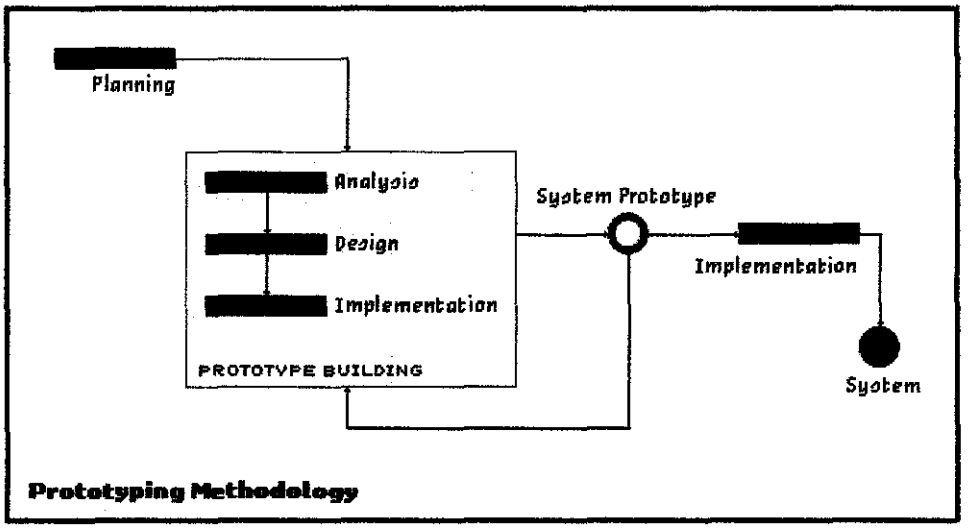


Figure 3.1 A Prototyping-based Methodology

In the planning stage, author had identified why the validation tool should be enhance and it guided on how the author will go about developing the validation tool. It refers back to the objectives of the project which to add the additional criteria and test validation tool against human validation.

Analysis phase involve three steps:

1. *Analysis strategy*. This step consists of analysis on previous validation tool including its problems and the way to design new validation tool.
2. *Requirement gathering*. Several requirements gathering technique been used in collecting the information which are:

i. Literature research

It involves systematic and thorough study of all readily existing information or materials. Author used literature research because it provides better understanding of the research topic, with its key issues and awareness that has already been conducted. It is also a very low-cost technique of gathering information and for literature search over the web, it can be considered as the fastest and less time consuming. Other materials the author has been used for literature review are newspapers, books, e-books, magazines, on-line data bases and many more published materials. It is very useful in reviewing the existing validation tool. While doing this, author got better understanding on the validation tool, how it works and some sample result after validation.

ii. Observations

Watching people used the websites is very powerful tool because the analyst can see the reality of the situation. It is to check the validity of the information gathered from the interviews and questionnaires if any and the cost is also low. The author done this for the human validation process and also while testing the prototype.

Design phase determines how this validation tool will look alike. In this phase, the author designs the interface of the new validator. It has three methods in validating the website. First is validating via URL where user can simply insert the URL of the website to validate it. Second is validating by file upload. This method allows user to upload the files that are not yet publicly available on the internet. Third method is validating by direct input or also known as copy/paste HTML. User can select the criteria they want to validate whether compulsory, additional or both criteria. Result will be shown in the new web page.

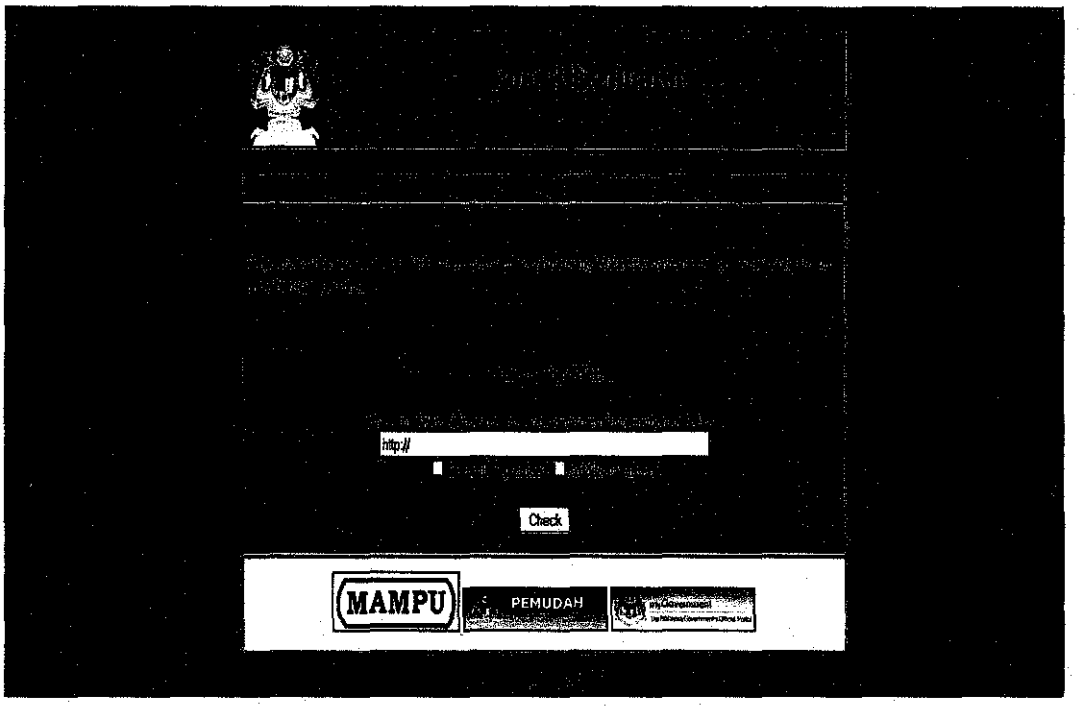


Figure 3.2 First Prototype (Validate by URL)

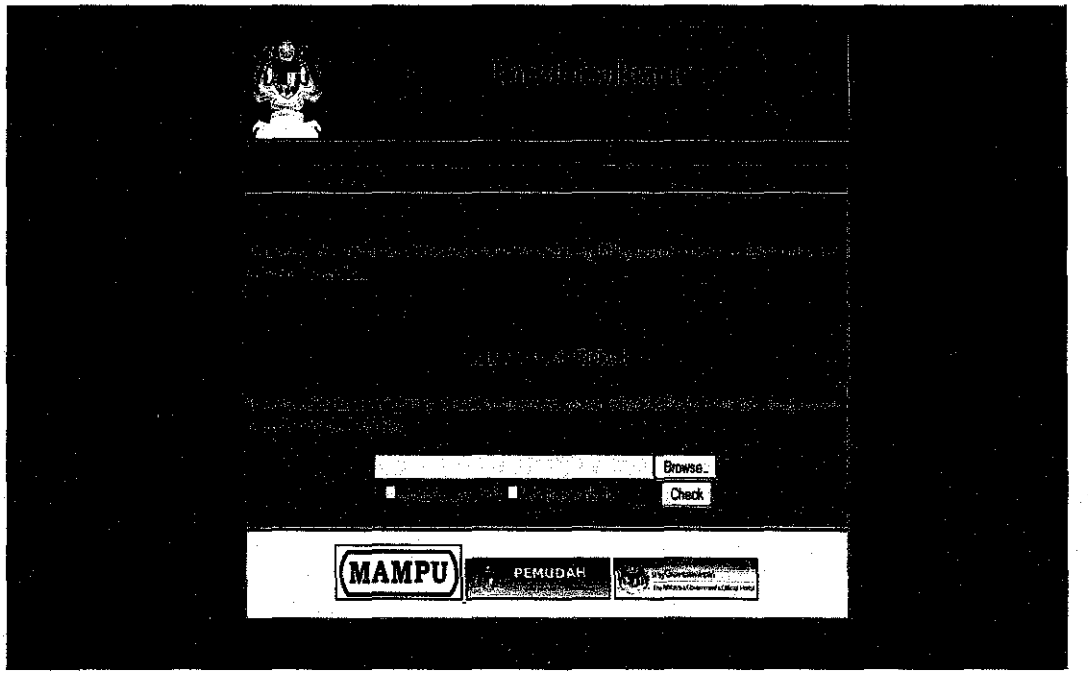


Figure 3.3 First Prototype (Validate by File Upload)

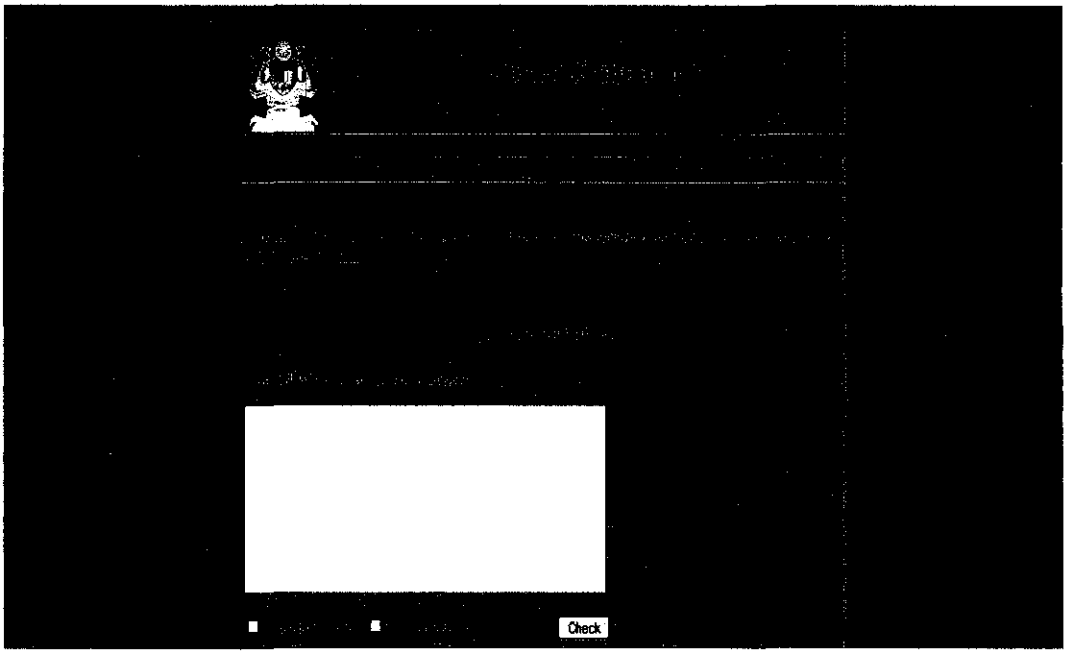


Figure 3.4 First Prototype (Copy/Paste HTML)

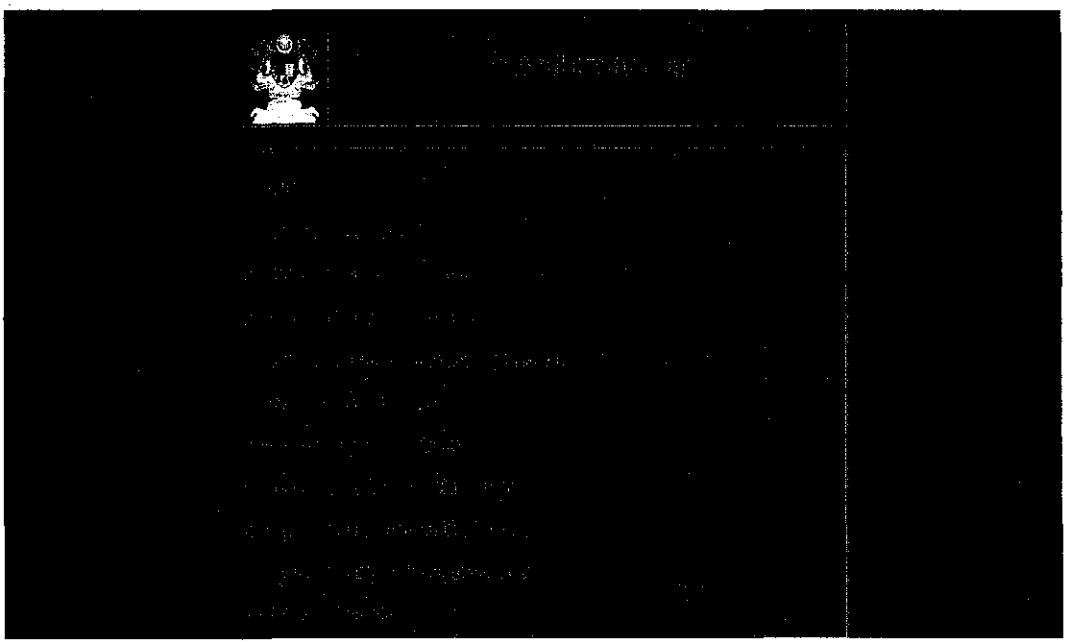


Figure 3.5 First Prototype (Result)

Below are the tools that being used in development of the validation tool:

1. MySQL
2. phpMyAdmin
3. HTML
4. PHP
5. xampp-win32-1.7.0
6. Web browsers (Opera 9.63, Google Chrome, Mozilla Firefox 3.0.8 and Internet Explorer 6)

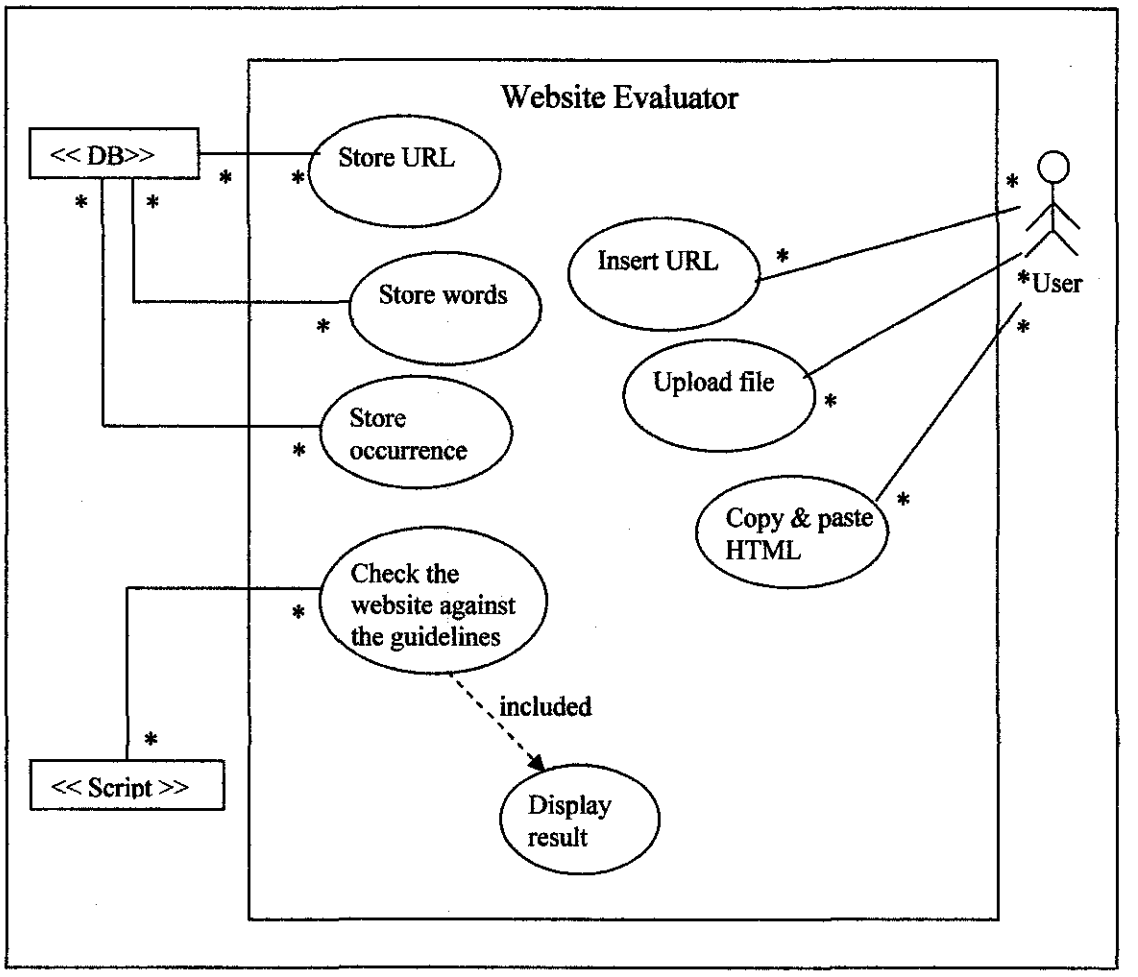


Figure 3.6 System Use-Case Diagram

This project is now reaching analysis and testing phase. The author is using prototyping-based methodology where system prototype is being built instead of completed system itself. The analysis, design, and implementation phases will be performed repeatedly based on the user comments until the prototype successfully meets the requirements.

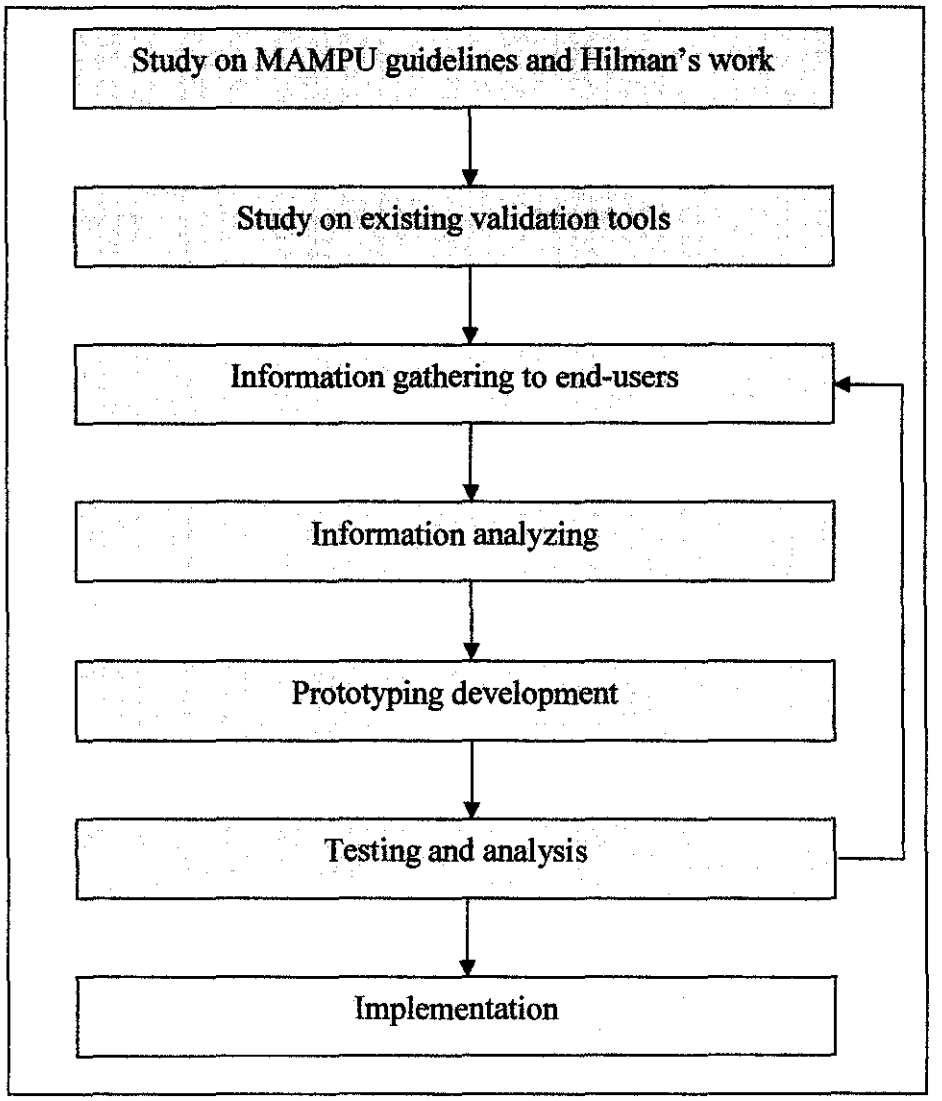


Figure 3.7 Project Workflow Diagram

User test is done by selecting random people to test the website evaluator prototype and the users are asking to do thorough test on the site function. Results are used to improve the website.

3.2 System Conceptual Design

The conceptual design of the system consists of three main tables which are page, word and occurrence.

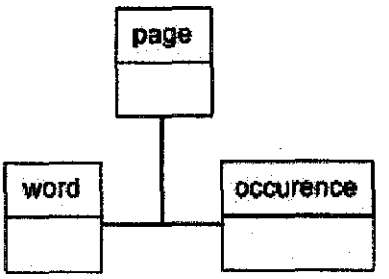


Figure 3.8 Database Representation

Once the user click "check" button, the web page will be indexed into the table 'page'. Table 'page' will holds all indexed web pages which are going to be validated. Table 'word' is use to holds all the words found on the indexed page. Occurrence identify how many times the word appear on that particular website.

Below are the structures of the tables in the database.

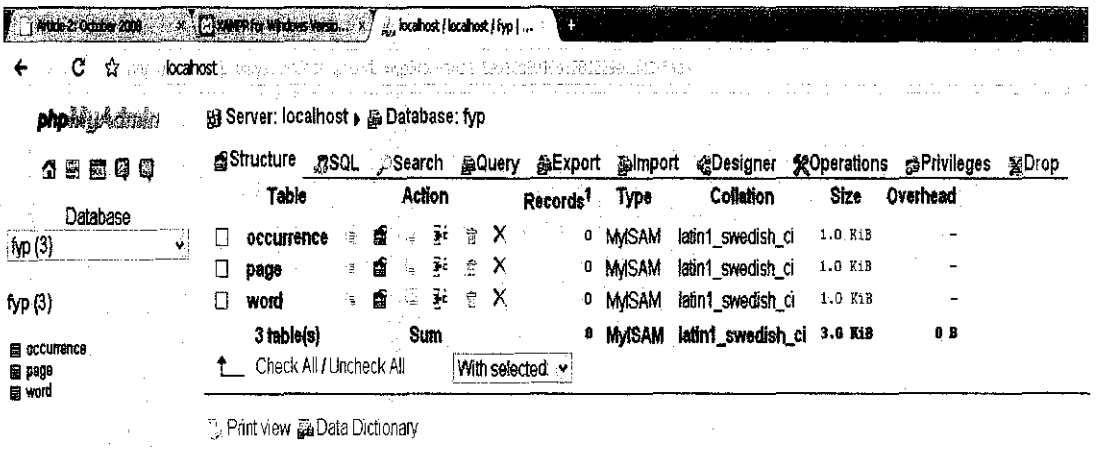


Figure 3.9 Database (all tables)

occurrence
page
word

Field	Type	Collation	Attributes	Null	Default	Extra	Action
page_id	int(11)			No	None	auto_increment	
page_url	varchar(200)	latin1_swedish_ci		No	None		

Check All / Uncheck All With selected:

Print view Relation view Propose table structure

Add 1 field(s) At End of Table At Beginning of Table After page_id Go

+ Details...

Open new phpMyAdmin window

Figure 3.10 Table Page

occurrence
page
word

Field	Type	Collation	Attributes	Null	Default	Extra	Action
word_id	int(11)			No	None	auto_increment	
word_word	varchar(50)	latin1_swedish_ci		No	None		

Check All / Uncheck All With selected:

Print view Relation view Propose table structure

Add 1 field(s) At End of Table At Beginning of Table After word_id Go

+ Details...

Figure 3.11 Table Word

occurrence
page
word

Field	Type	Collation	Attributes	Null	Default	Extra	Action
occurrence_id	int(11)			No	None	auto_increment	
word_id	int(11)			No	0		
page_id	int(11)			No	0		

Check All / Uncheck All With selected:

Print view Relation view Propose table structure

Add 1 field(s) At End of Table At Beginning of Table After occurrence_id Go

+ Details...

Figure 3.12 Table Occurrence

Figure 3.13 shows the basic flow on how this website works. Firstly, user will select the method to validate the website. After that, user has to choose whether want to validate the compulsory criteria only, additional criteria only or both criteria. Then, the website will populate all the keywords and insert it into the database (table page and word). The search function will do the keyword searching based on the selected criteria. If the keywords are found, it will display the results on the next page. For file upload, the file will be stored and read first before all keywords are being populated.

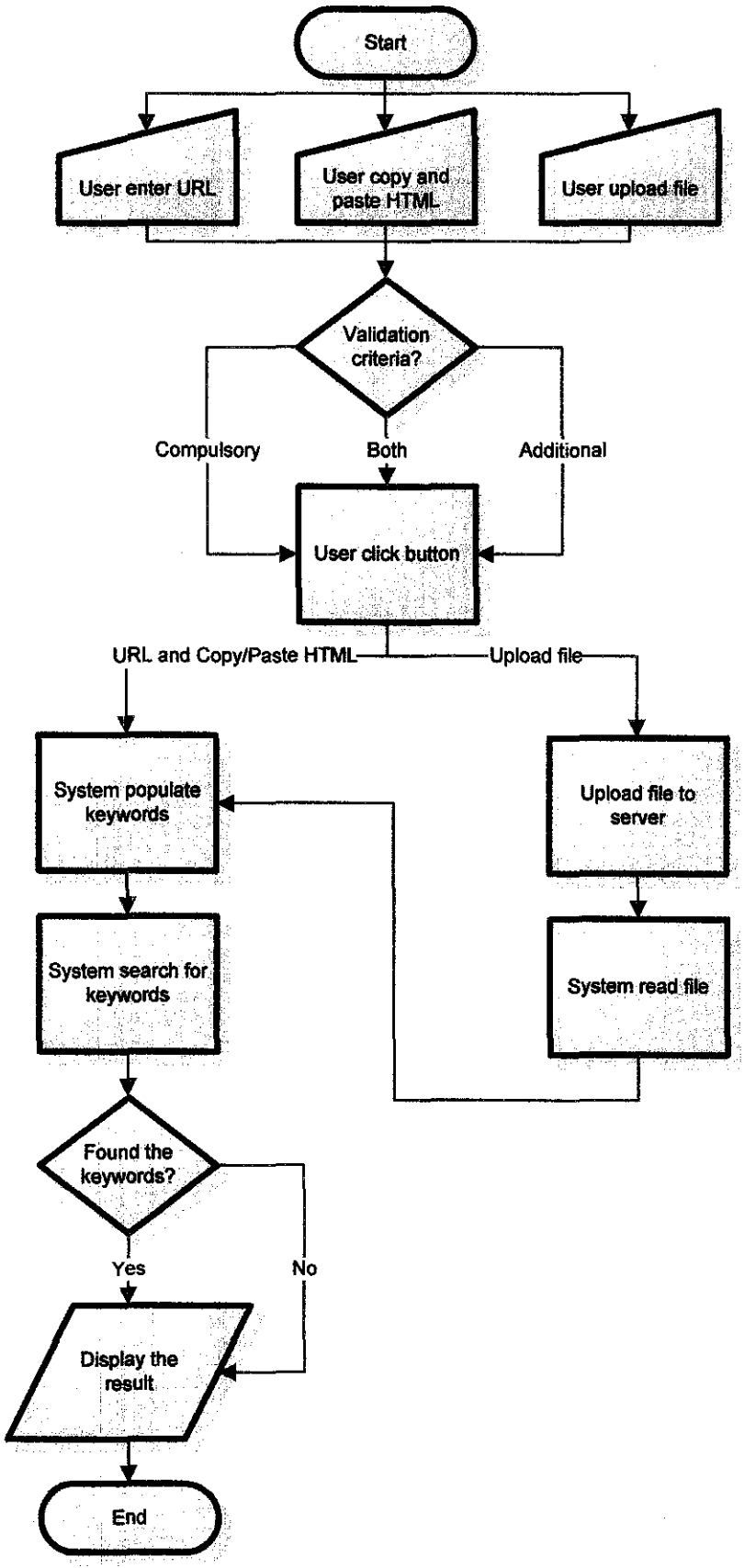


Figure 3.13 Flowchart on Validation Process

3.3 Human Validation Process

Human evaluation form is used to compare the result between validation tool and human validation. The form is available on **Appendix 3**. Sample of task scenario have been created for the human validation. Users are given a set of instructions to be accomplished and the time they are taken to accomplish the task will be recorded as well as number of errors they encountered. Result of the human validation process is available on **Appendix 4.** User usually takes around 5 minutes to complete the task scenario. There are also a few errors encountered by the user while doing the task. With the availability of the website evaluator, those errors can be reducing as the system has strict rules which it must follow.

3.4 Project Flow

Table 3.1 Gantt chart for FYP Semester 1

No	Activities / Week	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	Selection of Project Topic														
2	Preliminary Research Work														
3	Submission of Preliminary Report														
4	Seminar 1 (optional)														
5	Project Work - update progress report - add e-Government in literature review														
6	Submission of Progress Report														
7	Seminar 2(compulsory)														
8	Project Work Continues - update progress report - add human validation - prepare presentation slide														
9	Submission of Interim Report														
10	Oral Presentation														

Table 3.2 Gantt chart for FYP Semester 2

No	Activities / Week	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	Project Work Continue														
2	Submission of Progress Report 1														
3	Project Work Continue - redesign validation tool - plan human validation process and evaluation														
4	Submission of Progress Report 2														
5	Seminar (compulsory)														
6	Project work continue - correction on grammar - perform system testing - perform human validation process														
7	Poster Exhibition														
8	Submission of Dissertation (soft bound)														
9	Oral Presentation														
10	Submission of Project Dissertation (Hard Bound)														

CHAPTER 4

RESULT AND DISCUSSION

4.1 Result and Discussion

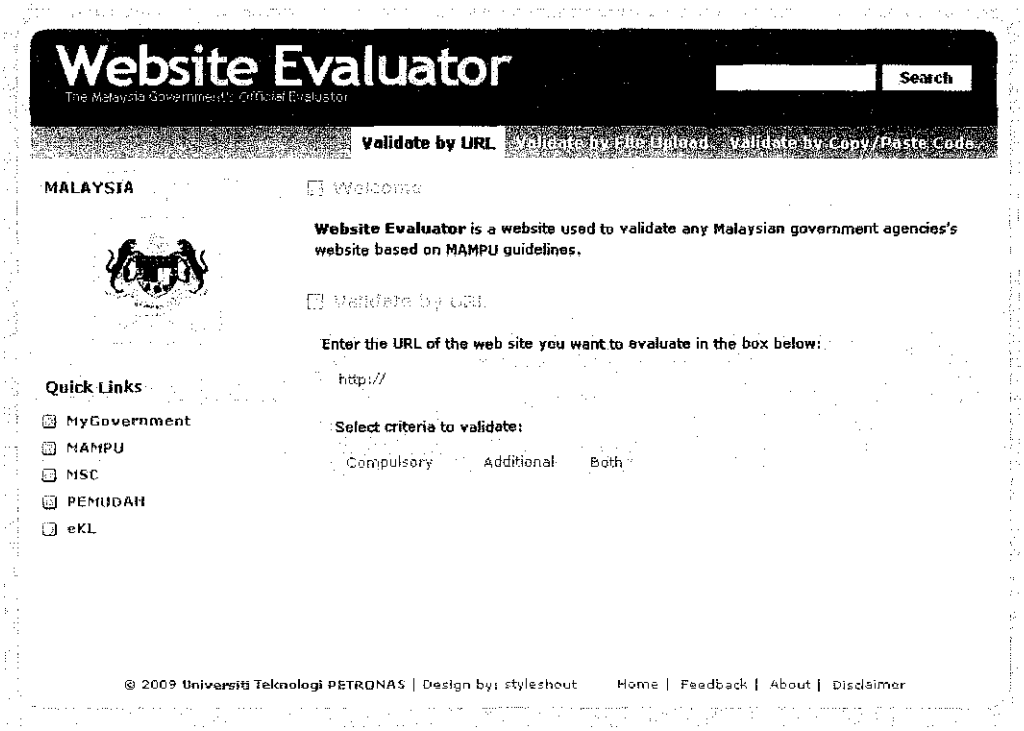


Figure 4.1 Validate by URL Interface

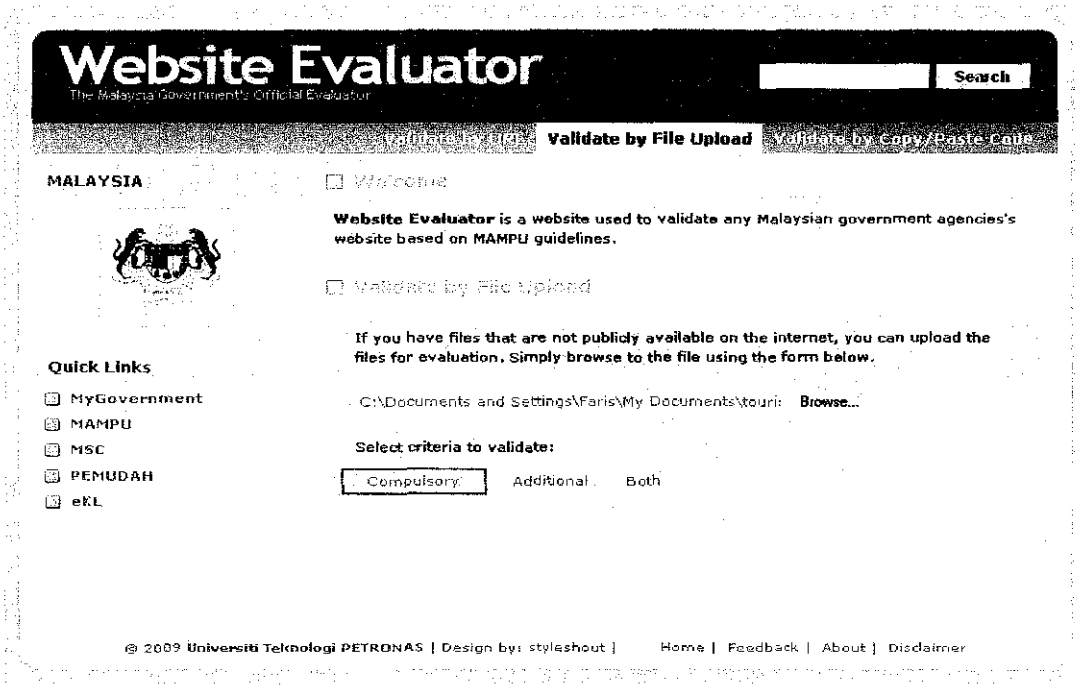


Figure 4.2 Validate by File Upload Interface

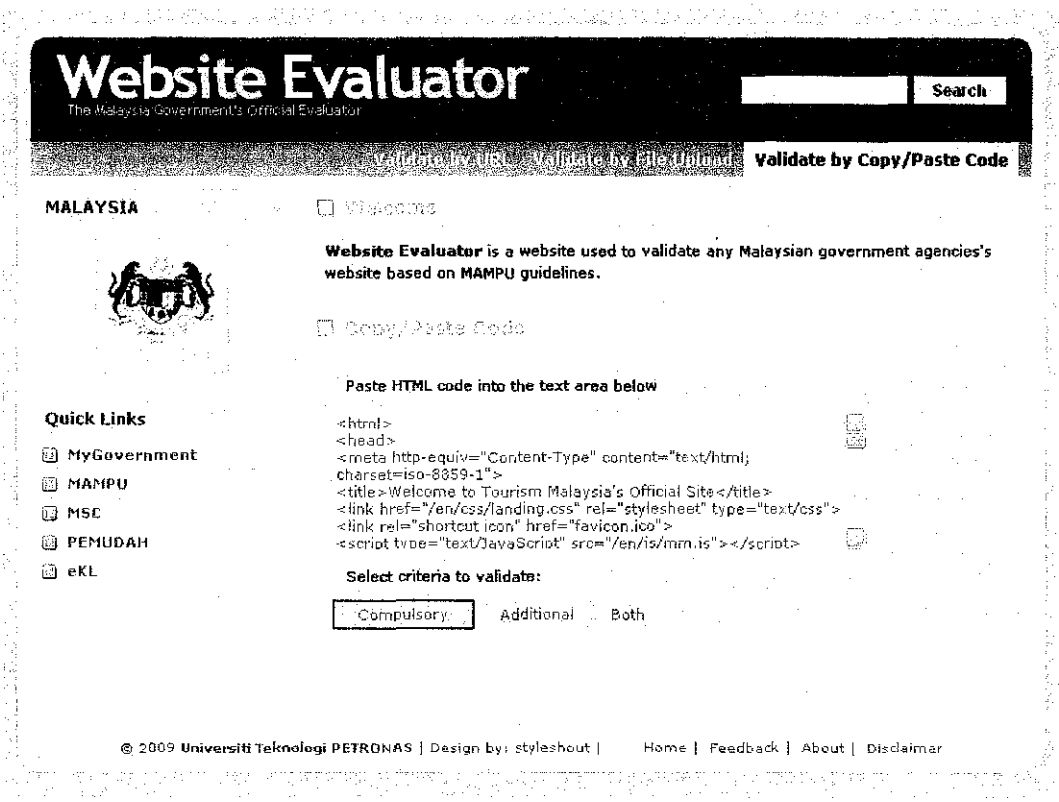


Figure 4.3 Copy/Paste HTML Interface

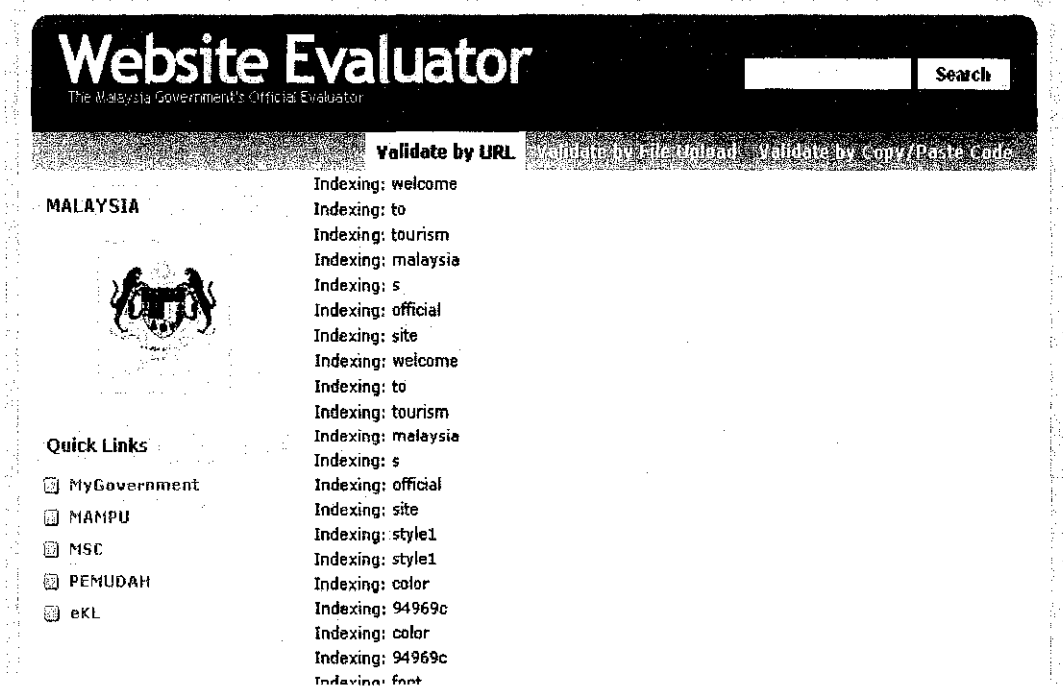


Figure 4.4 Populating the keywords

Figure 4.4 shows the keywords being populated word by word into table 'word'. Refer to **Figure 4.9**.

Figure 4.5 Result after searching

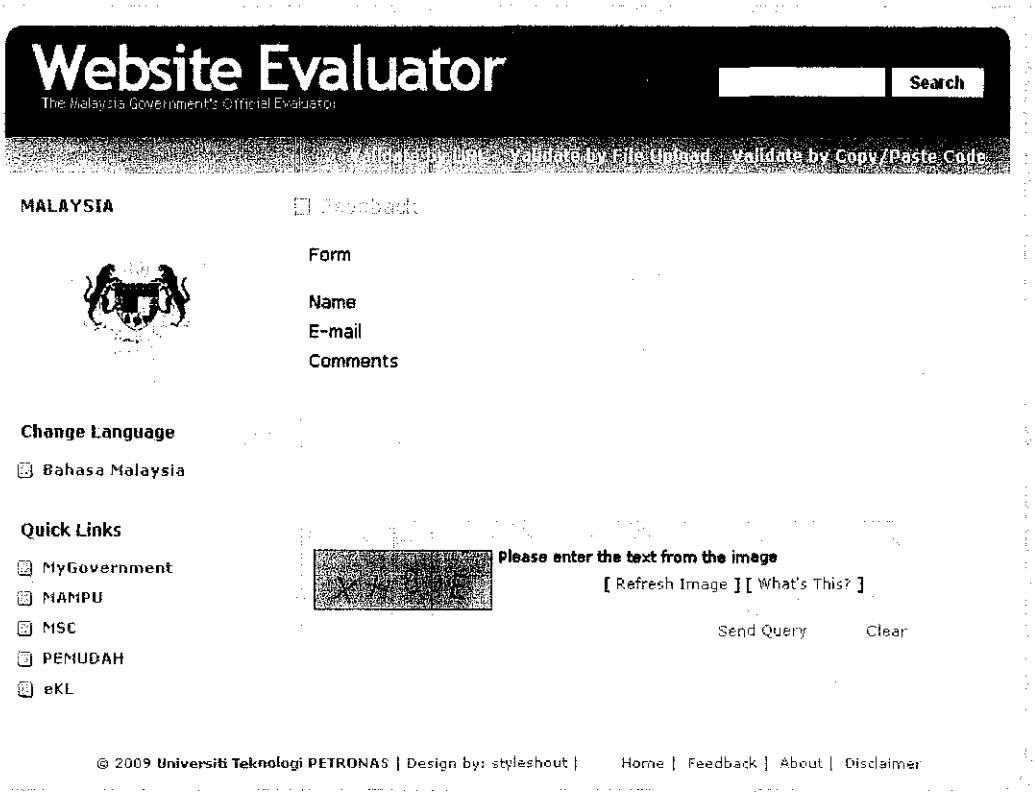


Figure 4.6 Feedback Form with Image Verification

Image verification helps to avoid any human or non-human from sending spam to the website administrator.

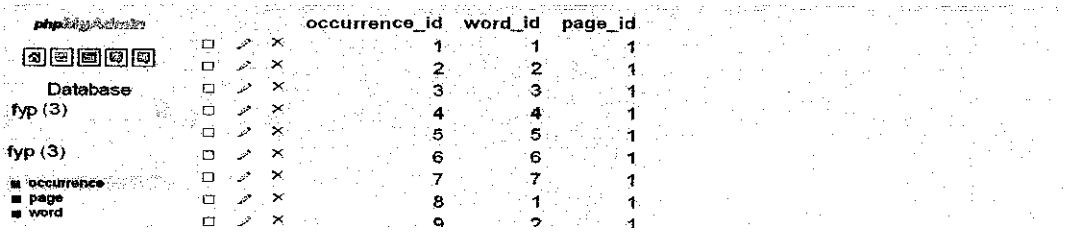


Figure 4.7 Result from Table occurrence

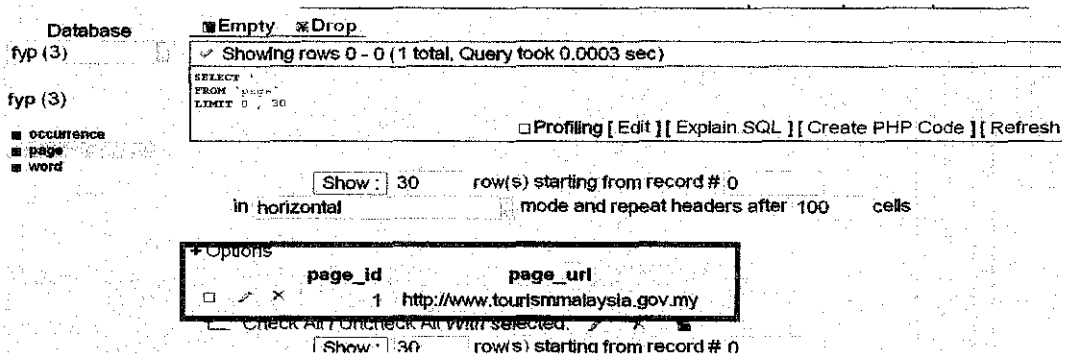


Figure 4.8 Result from Table page

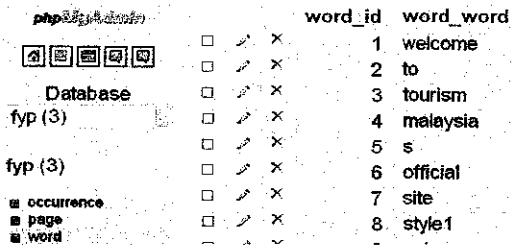


Figure 4.9 Result from Table word

Figure 4.1-4.6 above shows the final interface of the web evaluator prototype. There are three ways user can choose to evaluate the website. One of it is by entering the address of the website. Second method is by uploading a file. They can browse the file they want to evaluate from their computer. User also can choose to just copy and paste the HTML code to the box provided on the web. In database, the keywords are being inserted into the tables in the database as shown in **Figure 4.7** to **Figure 4.9**.

The two objectives can be considered achieved. The system provides option for user to select how they want to validate the website (by URL, file upload, copy/paste) with the suggestion to solve for missing keywords where the previous system doesn't has and also the option for the criteria (compulsory, additional or both) to be validated. Second objective is discussed in the **Chapter 3.3**.

CHAPTER 5

CONCLUSION AND RECOMMENDATION

5.1 Conclusion

The implementation of any e-government initiative requires a focus on continuous improvement. The demands on governments to continually maintain and even upgrade standards of living continue to increase. With e-government, it helps to reduce efforts of the citizen to come to the post office in order to renew their driving licenses, pay bills and some other things. Thus, they expect the government to maintain and continuously improve e-government services. This website evaluator aids the government agencies in increasing their website accessibility, usability and credibility. Website becomes more credible when it meets the standards set by the government as in the MAMPU guidelines. This evaluator also assists human's work and makes it easier in checking all those criteria. It reduces a lot of time taken to validate each website. Thus those valuable times can be used for improvement in other areas. With the increasing of website accessibility, usability and credibility, e-government ranking will eventually rise to the targeted position.

5.2 Recommendation

Current validator cannot validate logo since it is in picture format. Thus in the future, developer can upgrade the validator by making it more precise and compliance to the MAMPU guidelines. One of the solutions for this problem is by requesting the companies or organizations to submit their official logo to the developer to be kept in the database. By doing so, the developer can make a validator which can compare the logo in the database with the logo on the website. However, the size must be the same. If not, it cannot produce the correct result. It also cannot validate flash based website. Some of the developers used flash based website to make the website more interactive and appealing. Therefore, for the future work, website evaluator can be enhanced more to make it able to validate any type based of website.

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APPENDICES

Appendix 1: Validating the Referring URL

Validation of the referring URL allows authors to conveniently use the same HTML as a validation link on any page:

```
<A
HREF="http://www.htmlhelp.com/cgi-bin/validate.cgi?url=referer">Validate
me</A>
```

To include the document's source, use the following:

```
<A
HREF="http://www.htmlhelp.com/cgi-
bin/validate.cgi?url=referer&amp;input=yes">Validate
me</A>
```

One may also use "referrer" in place of "referer".

Appendix 2: 2009 Waseda University e-Government Ranking

Annex

Research Name	5th Waseda University International e-Government Ranking 2009
Research Organization	Waseda University Institute of e-Government
Objective	To conduct a research on the status and development of e-government in the world, and to rank the surveyed countries based on the various criteria for an ideal e-Government.
Research Method	This research was conducted by the staff of Waseda University Institute of e-Government and researchers of Waseda University Graduate School of Global Information and Telecommunications Studies, under the guidance of Professor Toshio Obi, Director, Institute of e-Government. Along with the assessment of relevant web pages, the Waseda University Institute of E-Government carried out several activities during the year: organized e-government experts' conferences and invited them as researchers. Members of the Institute attended international e-Government conferences, and visited governments and think-tanks in major countries. In addition, references of international organizations such as APEC, OECD, the International Telecommunications Union (ITU) ,the World Bank and World Economic Forum, were uesed. A total of 34 countries or economies served as the sampling units for this research, which includes: Australia, Belgium, Brazil, Brunei, Canada, China, Chile, Fiji, Finland, France, Germany, Hong Kong, India. Indonesia, Italy, Japan, Korea, Malaysia, Mexico, Netherlands, New Zealand, Norway, Peru, Philippines, Russia, Singapore, South Africa, Spain, Sweden, Taiwan ,Thailand,, United Kingdom, the United States, Vietnam The research was conducted throughout year 2008, in three periods, from April to July for preparation, from August to November for research proceedings, and whole December and January for review and finalization.
Evaluation	A total of 28 indicators including more than 100 parameters were used to evaluate six fields that constitute an ideal e-Government. Some parameters were measured by using 5-points scale, while rest of them were measured by check list methodology. Each sector has been tested whether its reliability is significant or not, in both quantitative and qualitative measurement.
Research items	6 sectors, 28 indicators (including 115 parameters)

5th Waseda University International ranking on e-Government 2009

Rank	Country	Weighted Score
1	Singapore	92.89
2	U.S.A.	89.31
3	Sweden	86.94
4	U.K.	85.45
5	Japan	82.30
5	Korea	82.30
7	Canada	80
8	Taiwan	78.69
9	Finland	76.02
10	Germany	75.30
10	Italy	75.30
12	Norway	73.84
13	Australia	73.6
14	HongKong	71.86
15	Belgium	71.26
16	Spain	70.77
17	France	70.61
18	Netherlands	68.88
19	New Zealand	68.58
20	Mexico	64.68
21	Thailand	64.51
22	Malaysia	63.38
23	Indonesia	62.02
24	India	60.89
25	South Africa	55.45
26	China	53.25
27	Philippines	50.81
28	Chile	47.11
29	Russia	41.66
30	Brazil	41.28
31	Vietnam	40.77
32	Peru	38.26
33	Brunei	33.59
34	Fiji	26.02

Table 2: Dimensions and Indicators

Sectors	Items
1. Network Preparedness	1-1 Internet users 1-2 Broadband users 1-3 Digital mobile users 1-4 PC users
2. Required Interface-Functioning Applications	2-1 Cyber Laws 2-2 e-tender system 2-3 e-tax system 2-4 e-payment system 2-5 e-voting system 2-6 Social Security Services 2-7 Civil Registration Services 2-8 Consular Services 2-9 Labor Related Services
3. Management Optimization	3-1 Optimization Awareness 3-2 Integrated Enterprise Architecture 3-3 Administrative and budgetary systems
4. National Portal	4-1 Navigation 4-2 Interactivity 4-3 Interface 4-4 Technical
5. CIO in Government	5-1 CIO Presence 5-2 CIO Development Programs 5-3 CIO Organizations 5-4 CIO Mandate
6. e-Government Promotion	6-1 Legal Mechanism 6-2 Enabling Mechanism 6-3 Support Mechanism 6-4 Assessment Mechanism

Table 3: Top 10 Ranking for Each Sector

Interface Function and Applications	
1	U.S.A.
2	Singapore
3	Canada
4	France
5	Australia
6	U.K.
7	Japan
8	New Zealand
9	Belgium
10	Spain

Mgt. Optimization	
1	Singapore
2	Germany
3	Taiwan
4	Italy
5	France
6	Spain
7	Japan
8	Sweden
9	Finland
10	Thailand

National Portal	
1	Singapore
2	U.S.A.
3	Korea
4	Malaysia
5	Sweden
6	Canada
7	Finland
8	Hong Kong
9	U.K.
10	Taiwan

CIO in Government	
1	U.S.A.
2	Korea
3	Singapore
4	Japan
5	UK
6	Thailand
7	Canada
8	Germany
9	Malaysia
10	Taiwan

e-Gov Promotion	
1	Sweden
2	Japan
3	Korea
4	U.K.
5	U.S.A.
6	Canada
7	Singapore
8	Australia
9	Mexico
10	Norway

Network preparedness	
1	Singapore
2	Sweden
3	USA
4	Australia
5	Japan
6	Canada
7	New Zealand
8	Finland
9	Korea
10	UK

Table 4: Comparison on the 1st, 2nd, 3rd, 4th and 5th ranking results

2009		2008		2007		2006		2005	
1	Singapore	1	USA	1	USA	1	USA	1	USA
2	U.S.A.	2	Singapore	2	Singapore	2	Canada	2	Canada
3	Sweden.	3	Canada	3	Canada	3	Singapore	3	Singapore
4	U.K	4	Korea	4	Japan	4	Japan	4	Finland
5	Japan	5	Japan	4	Korea	5	Korea	5	Sweden
5	Korea	6	Hong Kong	6	Australia	6	Germany	6	Australia
7	Canada	7	Australia	7	Finland	7	Taiwan	7	Japan
8	Taiwan	8	Finland	8	Taiwan	8	Australia	8	Hong Kong
9	Finland	9	Sweden	9	UK	9	UK	9	Malaysia
10	Germany Italy	9	Taiwan	10	Sweden	10	Finland	10	UK

Appendix 3: Human Validation Survey

VALIDATION FORM

This survey is intended for aiding the final year project regarding validation of government agencies websites/portals based on MAMPU guidelines.

PLEASE SELECT WHICH WEBSITE YOU WANT TO DO VALIDATION:

☐ Ministry of Education Malaysia http://www.moe.gov.my/

☐ Minister of Culture, Arts and Tourism Malaysia http://www.tourismmalaysia.gov.my/

M		F		Gender

Age

20-29		30-39		40-49		50-59		60-Above	

Rating scale: (1) - strongly disagree (3) - agree (5) – strongly agree
Please circle:

1. The website takes considerate amount of time to fully load.

   (1) (2) (3) (4) (5)

2. The website clearly stated as it is one of the government agencies website.

   (1) (2) (3) (4) (5)

3. I think the contents in the website are well organized.

   (1) (2) (3) (4) (5)

5. I found the website provides some useful videos and audios.

   (1) (2) (3) (4) (5)

6. I found the website unnecessarily complex.

   (1) (2) (3) (4) (5)

7. I thought the website was easy to use.

   (1) (2) (3) (4) (5)

8. I thought there was too much inconsistency in this website.

   (1) (2) (3) (4) (5)

9. I think that I would need the support to be able to use this website.

(1) (2) (3) (4) (5)

10. The website provide supported link such as help and trouble shooting.

(1) (2) (3) (4) (5)

11. The contents of the supported link is enough to help me solve my problem/s.

(1) (2) (3) (4) (5)

12. I would imagine that most people would learn to use this website very quickly.

(1) (2) (3) (4) (5)

13. I felt very confident using the website.

(1) (2) (3) (4) (5)

14. I needed to learn a lot of things before I could get going with this website.

(1) (2) (3) (4) (5)

15. Is this the first time you have visited the government agencies website?

Yes No

16. Which method/s do you prefer to validate the website?

☐ Validation tool

☐ Human validation

Why?

.....

.....

.....

.....

Thank you for your participation.

Appendix 4: Human Validation Process

TASK SCENARIO

1. You want to view video available on the website.
2. You want to download any video, audio or file.
3. You decided to give comment or send and enquiry on the website.
4. You want to read frequently ask questions (FAQs) provided in that website.

Result for Ministry of Culture, Art and Tourism website

(Time taken: 5 minutes)

1. No error. Video available on the home page.
2. No error in downloading audio. 1 error in downloading video. Cannot find way how to download that video.
3. No error.
4. Error. Cannot find the FAQs.

Result for Ministry of Education

(Time taken: 5 minutes)

1. No error. But slow loading because it opens up new web page.
2. No error in downloading file and video. But cannot find way to download audio.
3. 1 error. Open up FAQs.
4. No error because already know where is it.