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Research paper



Accessibility Design Issues with Malaysian News Websites: a Case Study Using a Checker and WAVE

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Abstract

The objective of this research is to provide public society and web developers with a higher level of awareness on web accessibility issues in Malaysian websites. The finding is extremely crucial to avoid discrimination among the disable community to use Information and Communication Technologies (ICT) in their daily lives. Accessibility evaluation has been performed on four Malaysian broadsheet news websites using two online automated tools. The analysis is based on the compliance level of the WCAG (Web Content Accessibility Guidelines) 2.0 standard. The research also identified the common accessibility design issues found in most of Malaysian news websites. The result of this study shows that none of the Malaysian news website conformed with WCAG 2.0 standard. The websites fail to provide an alternative text to convey the information for non-text content in their websites. Therefore, serious improvement is needed to improve the accessibility of the websites with the aim to provide the universal access websites.

Keywords: *News websites; Online Tools; Web Accessibility; WCAG 2.0*

1. Introduction

Today, we are offered with various method to receive latest news. It can be ranged from traditional printed newspaper, digital media on desktop to news website that can be accessed on mobile phone through Internet connection. According to the annual Internet World Stats as of June 2015, there are over 3.27 billion internet users have access to the Internet [1].

Majority of news providers in the west launched their online version of newspapers in the middle of the 1990s and this become a favored source of news for many[2]. Nowadays, the news website is not only serves as an online version of printed newspapers, but it has also evolved to become an interactive website which promotes ease of access to the wide variety news. News website is a specific type of information presenting web portal and it differ from other type of website in many aspects which carry important implications to their use, experience of use, evaluation and quality criteria [3].

News website is a public website where it should take a responsibility to promote universal access[4]. Universal accessibility is a design philosophy developed in the last decade trying to avoid exclusion of people with disability from using information and communication technologies (ICTs) [5]. Therefore, applications and services should be produced in such a way to reduce the barrier for the disabled community.

World Wide Web Consortium(W3C) has taken a huge step in their Web Accessibility Initiative (WAI) project to develop the WCAG guidelines. The guidelines is used as a reference for the designer to develop more accessible website [6]. The latest version of the guideline is WCAG 2.0. It has become the standard for web accessibility [7] for many organization and country. The guidelines cover a wide range of technical design aspect and provide recommendation for making a website more accessible.

Conformance to WCAG 2.0 standard can be used as measuring criteria to evaluate the accessibility of a website. WCAG 2.0 believes that an accessible website must be implemented with basic design principles which are perceivable, operable, understandable and robust. The evaluation is measured by the success criteria with three conformance level. This process can be performed by using an online tool, where it generally will check the websites design and content against the standard.

There are a lot of researches to evaluate web accessibility status in different type of website domain[8][7][9][10]. However, the assessment on news website is rarely to be found. Therefore, the objective of this research is to provide public society and web developers with a higher level of awareness on web accessibility issues in Malaysian websites. To perform this research, four Malaysian broadsheet news websites were selected as a case study and tested using AChecker and WAVE.

This paper is organized as follows. Section 2 covers the literature review which includes the web accessibility standards, available tools as well as a review of past related studies on web accessibility. Section 3 presents the methods used in this study, while Section 4 presents the detailed results and discussion. Section 5 summaries the conclusion and provides the directions for future research.

2. Literature Review

Web accessibility is one of the design aspects that should be on the prioritise during the designing phase. Web developers are required to understand users' need and abilities without any discrimination. They should adhere to the web accessibility standard to achieve the universal access philosophy. The accessibility level can be measured using online tools that are readily available in the market.

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2.1. Web Content Accessibility Guidelines (WCAG)

W3C is an international consortium that has gone thorough processes in collaboration with individual and organization around the world to develop WCAG standard. This standard was specified under the Accessibility Initiative (WAI) program, with aim to provide a single shared standard for web content accessibility that meets the need of individual, organization and government internationally. The target users for the standard was primarily for the web content developers, and anyone who wanted a standard for web accessibility. WCAG also covers for mobile accessibility. WCAG has been recognized as an international standard for web accessibility.

WCAG 1.0 was published in 1999 which consists a total of 65 checkpoints and these checkpoints were classified according with three priority levels [11]. The WCAG 2.0 was then introduced in December 2008 with an enhancement to the previous version and to cater for the technology updates. WCAG 2.0 has twelve guidelines which adopted from four design principles namely perceivable, operable, understandable, and robust. It has 61 success criteria. The conformance was measured using a three-level categorization; Level A (lowest), Level AA, and Level AAA (highest).

Level A: the minimum level of conformance, a website satisfies the basic web accessibility features required by the guidelines, or an alternative content is provided to satisfy specific needs;

Level AA: Websites in this category satisfy Level A and AA requirements and offer further accessibility features that can overcome the most common difficulties for disabled users;

Level AAA: The web page satisfies all the Level A, Level AA and Level AAA success criteria. The highest level of this classification hosted by those websites that fulfilled all requirements and offers the most complete accessible experience for all users. The layers of WCAG 2.0 were described in Figure 1.

2.2. Web Accessibility Tools

Web accessibility tool is an automated program that perform evaluation and gives recommendation on web accessibility. It has become a powerful tool to access the status of web accessibility [12]. It also helps the developers to detect problems which it might be a tedious work to be done manually.

There are many web accessibility tools that are currently available in the market. It was reported by [13], Accessibility Valet, AChecker, Cynthia Says, EvalAccess, FAE, MAGENTA, OCAWA, TAW, WAVE and Web Accessibility Checker are the top-10 free tools.

Despite various brand of web accessibility tools, AChecker was used in most of the web accessibility evaluation studies [9],[7][14],[8],[6],[15],[13]. According to [9], AChecker was acknowledged as the most accurate web accessibility tools. AChecker classified the result in three groups: -

(1) Known problem - serious problem that has been identified as accessibility barriers. This problem must be fixed urgently to make the websites accessible.

(2) Likely problem – problem that identified as probable barriers. It requires for human to make decision to solve this issue.

(3) Potential problem – problem that AChecker cannot identify, and it requires human to decide.

In addition, WAVE also has been used in quite number of research. It was successfully used in [13][14][15][16]. WAVE provide a visual feedback about the web accessibility with embedded icon and indicator. Each icon, box and piece of information present some information about the accessibility of a website. WAVE classified their finding into Error, Alerts, Features, Structural Elements, HTML, ARIA and Contrast Error. WAVE has the capability to evaluate the accessibility of a website against WCAG 2.0 (Level A and AA) and Section 508.

Every web accessibility tool uses different algorithm to perform their evaluation against the accessibility standard. Some of the web accessibility can evaluate against more than one standard depending on the requirement of the websites.

2.2. Related Studies

Many studies have been conducted to understand current state of web accessibility conformance level based on different domain of websites [8][7][9][10].Various evaluation has been carrier out to measure the web accessibility of a university website [17][7][9][13]. The result of the study shown that the accessibility level of university website is very low. Majority of the website have the issue on equivalent text alternative for content that has been presented in non-text formats.

E-government sites also has come to the attention because it plays an important role providing information and services that is needed by the society. E-government websites should carry the responsibility to ensure the universal access for all citizen is implemented. However, based on the evaluation on web accessibility of a government's website [18][10][6], it shows that the level of conformance to web accessibility are still weak. Their research also revealed that most web designer did not fully adhere to the standard of WCAG.

The research on conformance to web accessibility guidelines has been perform on the e-commerce websites[19] and social network [20]. Based on numerous studies in different domain of websites, the evaluation of web accessibility on news website is hardly found. This is the main factor that influence us to perform this study.

Based literature, it shows that the awareness on accessibility of a websites is still at a very low level. Therefore, we have chosen to perform an accessibility evaluation of Malaysian news websites using AChecker and WAVE to measure its conformance level to WCAG 2.0 standard.

3. Research Methodology

For this research, a quantitative method has been adopted [18] to perform the evaluation on web accessibility level in Malaysian news websites. A comparative analysis is derived based on the accessibility result among the websites. The Figure 2 depict the steps taken to perform this research.

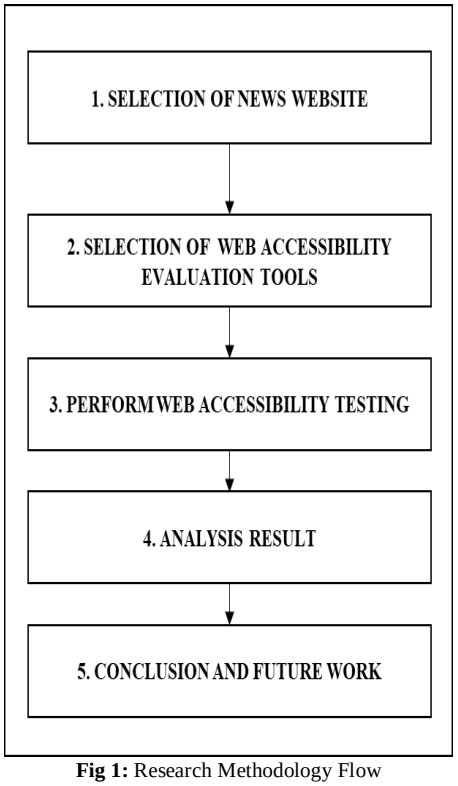


Fig 1: Research Methodology Flow

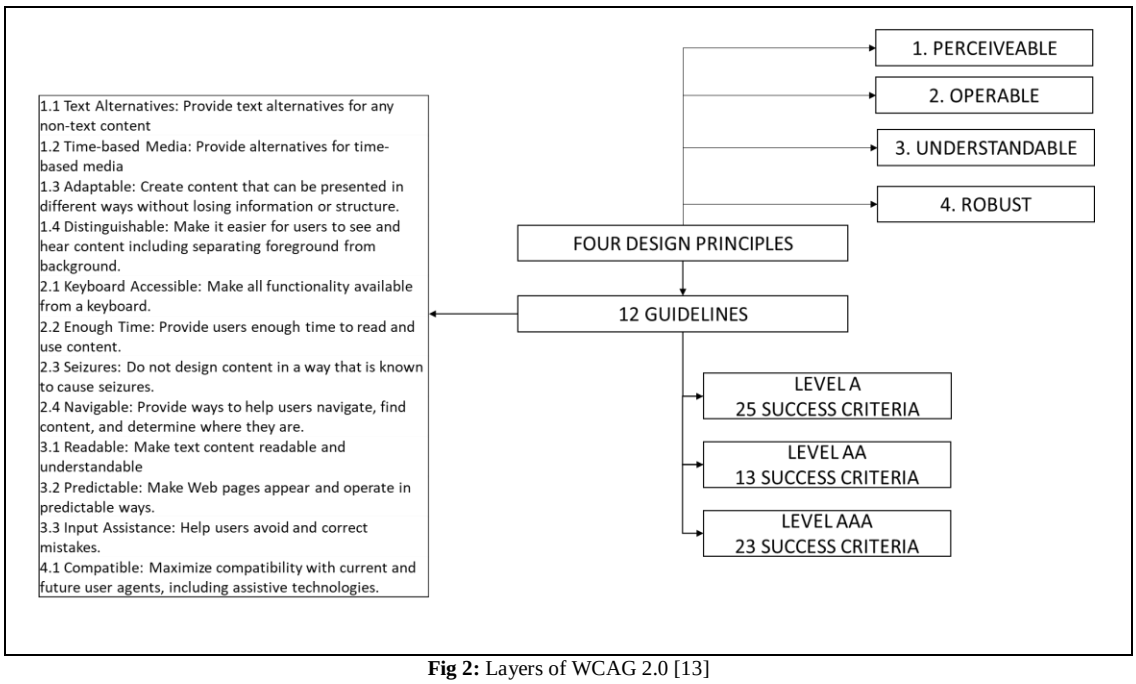


Fig 2: Layers of WCAG 2.0 [13]

The first phase of this study was to choose the broadsheet news website that is available in Malaysia. Four broadsheet news websites were selected based on popularity and language coverage. The listing of the chosen website is shown in Table 1.

Table 1: Malaysia Broadsheet News Website

Website ID	News website
WS1	https://www.utusan.com.my
WS2	https://www.nst.com.my
WS3	https://www.thestar.com.my
WS4	https://www.bharian.com.my/

The next phase is to choose the suitable web accessibility tools. Based on the literature, the two most suitable web accessibility tools were adopted to perform the evaluation: AChecker and WAVE. These were selected to access the accessibility of the news website against the WCAG 2.0 standard[7].

Then, web accessibility testing was carried out on the selected websites using the selected tools based on WCAG 2.0 standard. The assessment was conducted for two days. An empirical and comparative analysis were performed on the result derived from the testing phase.

The summary and conclusion of the result will be discussed in the following section.

4. Analysis and Discussion

A detailed comparative analysis was conducted based on the result derived from the evaluation of web accessibility in Malaysian news websites. The number of error incident and the most common accessibility design failure are reported as follows:

4.1 Web Accessibility Result Based on AChecker

Based on the result shown in Table 2, none of the tested news websites has passed the WCAG 2.0 Level A. An accessible website should at least comply to the WCAG 2.0 Level A category. Overall, the summary of the result shows that the level of compliance with respect to web accessibility requirements is very low. The news websites developer seemed unaware on the web accessibility compliance. However, based on the result, WS3 adhered the most to WCAG 2.0 Level A standard.

The Known Problem is a crucial problem and required immediate attention of the web developer. It should be rectified fast to make sure the websites are accessible for all. Therefore, details of Known Problem for all levels of WCAG 2.0 were reported in Table 3.

Table 1: AChecker Result Summary (ranked by compliance)

Website ID	WCAG 2.0 (Level A)			WCAG 2.0 (Level AA)			WCAG 2.0 (Level AAA)		
	K	L	P	K	L	P	K	L	P
WS3	3	0	187	10	0	196	10	0	201
WS1	18	3	1857	34	3	1933	34	3	2005
WS2	43	4	709	45	4	738	45	1	746
WS4	116	0	879	49	0	908	49	0	916
Total	180	7	3632	138	7	3775	138	4	3868

Legend: K= Known Problem, L=Likely Problem, P=Potential Problem

Based on the result in Table 3, it shows that majority of the news website failed to provide text alternatives for any non-text content in their websites. This issue deserves further attention for rectification since with overall 173 incidents of error contributes 96 percent for the conformance of level A. Web developers must see this as a serious issue because this error is important to make non-text contents information are conveyed using a text alternative. The web designer can enhance the method to convey the non-text information through any sensory method. For example, for the blind person who rely solely on audio input, web designer should set the alternative text, so it can be read aloud using the assistive tools. For a person who cannot hear an audio file, an alternative method should be available such as text are being displayed so that he or she can read it and understand the information.

The second highest known issue is concern on making the default presentation easy to be perceived by people with disabilities. It has contributed about 30 incidents of error and represent about 21 percent of all websites. The color contrast is the important elements that the web designer should be investigated. For an example the website presentation should help the user to easily separate foreground information from the background.

4.2 Web Accessibility Result Based on WAVE

Table 4 shows the summary of web accessibility result generated by WAVE. Overall result revealed that all selected news website has issue with web accessibility. Error indicates a serious

Table 2: Known Problem as per WCAG 2.0

WCAG 2.0 Known Problems	Total Count		
	WCAG 2.0 (Level A)	WCAG 2.0 (Level AA)	WCAG 2.0 (Level AAA)
1.1 Text Alternatives: Provide text alternatives for any non-text content	173	101	101
1.2 Time-based Media: Provide alternatives for time-based media	Not Applicable	Not Applicable	Not Applicable
1.3 Adaptable: Create content that can be presented in different ways without losing information or structure.	Not Applicable	Not Applicable	Not Applicable
1.4 Distinguishable: Make it easier for users to see and hear content including separating foreground from background.	0	30	30
2.1 Keyboard Accessible: Make all functionality available from a keyboard.	Not Applicable	Not Applicable	Not Applicable
2.2 Enough Time: Provide users enough time to read and use content.	Not Applicable	Not Applicable	Not Applicable
2.3 Seizures: Do not design content in a way that is known to cause seizures.	Not Applicable	Not Applicable	Not Applicable
2.4 Navigable: Provide ways to help users navigate, find content, and determine where they are.	1	1	1
3.1 Readable: Make text content readable and understandable	4	4	4
3.2 Predictable: Make Web pages appear and operate in predictable ways.	Not Applicable	Not Applicable	Not Applicable
3.3 Input Assistance: Help users avoid and correct mistakes.	Not Applicable	Not Applicable	Not Applicable
4.1 Compatible: Maximize compatibility with current and future user agents, including assistive technologies.	2	2	2
TOTAL	180	138	138

** Know problem listed are asper WCAG 2.0 (Level AA). In other level, it might be described differently based on the requirement of that level*
** n/a = not applicable*

Accessibility issues and need to be solved urgently. Based on the result, WS1 has the lowest error incidents compared to others website. While WS3 required web developer's immediate action. The most commonly found error among the website was unable to provide alternative text for non-text content. To rectify this problem, the web developer must provide the alternative text for the non-text content. This issue has become the major accessibility barrier especially for screen-reader users.

Table 3: WAVE Result Summary (ranked by compliance)

Website ID	Error	Alerts	Features	Structural Elements	HTML and ARIA	Contrast Error
WS1	31	170	82	207	404	40
WS2	61	62	52	49	6	55
WS4	72	36	21	66	10	74
WS3	88	53	10	125	16	16
Total	252	321	165	447	436	185

5. Future Research and Conclusion

In line with the increased reliance on the website to get latest news, news websites should ensure their websites is accessible regardless their users' ability, constraint and limitation. The aim to develop a universal access website should become their priority. In response, this paper has evaluated four Malaysian broadsheet news websites against the WCAG 2.0 standard. This study employed two automated tools available online, i.e AChecker and WAVE. The test was conducted within the browser.

Overall, result from both automated tools shows that none of the news website is accessible. They did not pass the minimum level of web accessibility requirement as stipulated in WCAG 2.0 (Level A). Most of the error incident required an immediate attention from the web developers. In most of the cases, the news website failed to provide alternative-text for non-text content. This study provides a meaningful insight particularly to the web developers and web designers to improve their website with adhering to the web accessibility standard.

However, this study evaluates the websites based only on the automated evaluation tools. Based on [10], relying solely on checking tools is not sufficient to justify the web accessibility aspect for a website. A study based on human evaluation should be taken in the future to understand how the disable community perceive the websites and to understand the relationship between web accessibility and user experience.

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