

E-government Accessibility in Thailand

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Abstract : This paper aims to observe the status of web accessibility compliance inherent in Thai e-government websites. E-government utilizes web technology for many objectives so the e-government is committed to making online information accessible to as many people as possible regardless of ability in order to provide equal access and opportunity for all. There are approximately 1.5 million people in Thailand in 2013 who will have some form of disability that may face problems if online information is inaccessible. In order to investigate the status of these events, the researcher performed multi techniques based on Web Content Accessibility Guideline (WCAG) 2.0. Results showed that Thai e-government websites would have accessibility issues even though Web Content Accessibility Guideline (WCAG) was promoted since 2008. Several suggestions are offered based on results of the research.

Keywords : Accessibility, People with disabilities, E-government.

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1. Introduction

The World Health Organization (WHO) reported that the numbers of people with disabilities are almost 15% of the world's population in 2010 and for those people with disabilities it is difficult to access information and communication technology [18]. Many services such as job searching, online banking, and consultation services etc. are delivered online in a modern society. Therefore, inaccessible online materials will lead people with disabilities to fewer opportunities to enjoy goods and services; moreover, it can cause poverty. The World Wide Web Consortium (W3C) has launched accessibility standards in terms of Web Content Accessibility Guidelines (WCAG) that provides a priority level for developing websites regarding special requirement for people with disabilities [12].

E-Government survey by United Nation observes that governments are indicated rising to adopt e-government as service delivery in term of "smart" applications in 2012 [27]. The report pointed out that the greatest number of e-government improvement is Europe (0.7188) followed by Americas (0.5403) and Asia (0.4992) that means Europe is the most improvement for e-government however, Asia is the least. Thai government has launched "Smart Thailand" strategy in national ICT policy framework 2011-2020 [15]. The strategy is divided into two main parts: readiness of ICT infrastructure (Smart Network) and readiness of government service (Smart Government). Thailand has big investment of e-government in order to improve quality of service by enabling the services with ICT.

1.1 Objective of the research

This paper aims to investigate the status of web accessibility compliance inherent in Thai E-government websites. Specifically, this research will examine the levels of awareness of web accessibility and suggest solutions based on the results of this research.

1.2 Review of the Literature

1.2.1 Web accessibility

The numerous web accessibility guidelines via WCAG, ISO and Section 508 have promoted to ensure accessible online materials. WCAG 2.0 has significant to meet the requirement of end people more than the ISO 9241:151 and Section 508 [22]. Web Content Accessibility Guidelines (WCAG) 2.0 promises to be more accessible to people with disabilities according to four principles: perceivable, operable, understandable and robust [5]. "Perceivable" means web contents and user interface modules which must be offered to people as obvious objects. "Operable" refers to the user interface modules and navigation components which should be designed in a way that they work properly. "Understandable" is about the design of a website with a friendly version. "Robust" refers to the capacity of website must be interpreted by a variety type of user agents. Each principle is divided into **success criteria** which offer three **conformance levels**: A, AA, AAA (Table 1).

Table 1: Level of WCAG guideline

level	Description
A	These requirements <u>must be</u> satisfied, otherwise one or more user groups cannot access to the web content.
AA	These requirements <u>should be</u> satisfied, otherwise some user groups will difficult to access the web content.
AAA	These requirements <u>may be</u> satisfied to enable easier access to the web content.

1.2.2 Thai accessibility policies and e-government

Thailand is the state parties of the Convention on the Rights of Persons with Disabilities and has signed on Convention Ratification since 2007 [25]. Thai government also published two plans for bridging the digital dived and web accessibility standards, namely Thai Web Content Accessibility Guideline (TWAG) and Bridging the Digital Divided Strategic Plan in order to development in ICT [7]. TWAG based on a modified version of WCAG [16]. The important drive of e-government in Thailand was the Sub-Committee of Promotion of Utilization of Information Technology in Public Organization in 1994 [24]. Many ICT projects of government agencies have implemented to support the initiative. The Electronic Government Agency (EGA), which is Thai ICT agency, promotes all suitable government online services by 2015 [2].

2. Materials and Methods

The principal research question was “What is the status of web accessibility compliance within Thai e-government websites?” In order to capture the whole picture, multi technique approach was used for web accessibility evaluation (Figure 1). The test was done in the concurrent data collection: automatic testing and manual evaluation.

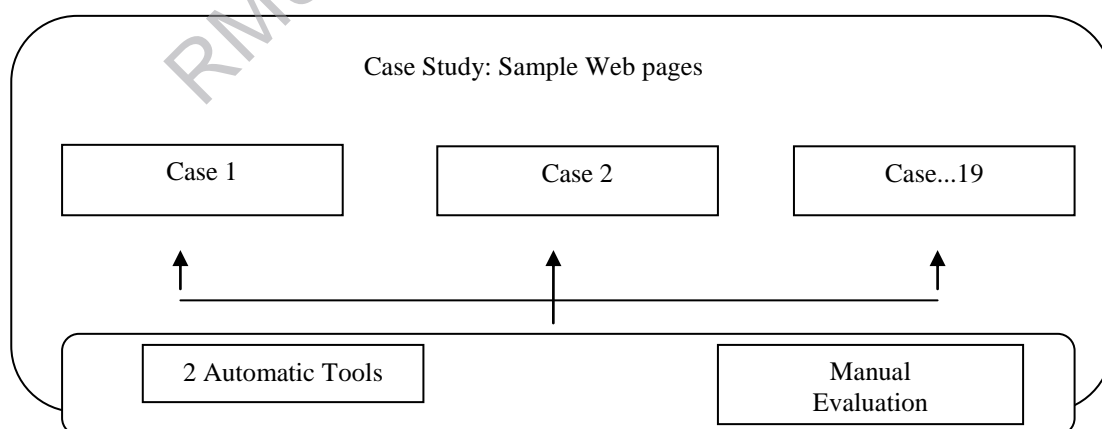


Figure 1: Multi-technique Approach

2.1 Automatic Testing

Thailand is broken into 20 ministries, however; only 19 ministries provide a wide range of e-service. Website Accessibility Conformance Evaluation Methodology 1.0 (WCAG-EM) suggests that accessibility evaluation should include common web pages of the website such as homepage, login page and other entry pages [31]. Therefore, this research will be conducted by selected one e-service website from each ministry and test pages, with the following being a priority;

- Home Page
- A page with input data element such as survey, search and form.

The scope of this stage allowed the auditing of 19 selected websites. SortSite shows balance between 30% of completeness and 95% of correctness scores in testing therefore, Sortsite is the efficient automatic tool for catching inaccessible issues in websites [28]. TAW is cited in Government Website Standard in order to evaluate web accessibility and the appropriate level for Thai agency websites is A [10]. Consequently, two automatic tools are SortSite [19] and TAW [11] to cross-check results.

2.2 Manual evaluation

Evaluation will be conducted by an expert. Test requires tools, such as Firefox [17], Firefox web development toolbar [6], and Colour Contrast Analyser [23]. 15 check points were compiled from manual accessibility evaluation [26] and WCAG.

2.3 Related work

The level of web accessibility in e-government in Korea was low, passing at 10% of level A [14]. The author also explained that lack of standard and police plays an important role in inaccessible sites. The similar results was reported that Saudi government homepages had accessible barriers, none of web pages complied with WCAG 2.0 [3]. Kuakiatwong also supported that Thailand Cyber University (TCU) had accessible issues when test selected pages with people who are blind [13].

3. Materials and Methods

3.1 Automatic Testing

Table 2 and 3 shows the results of Home Pages and input data pages which are evaluated by Sortsite. None of the 19 websites met WCAG 2.0 requirement, priority level A. Home Pages had accessibility problems at least 1 issue and reach to 21 issues (Table 2) at the same time, the minimum and maximum accessibility problems was 1 and 17 for input data pages (Table 3). The most common errors were lack of label element in form control, markup errors, and inadequate alt attribute in image.

All pages had usability issues at least 4 and up to 13 when tested the pages with usability.gov guidelines, and W3C Best Practices and Readability in Sortsite. The issues will be solved by the websites are required universal design (UD). People with disabilities access information in a website via different methods, for example, by a screen reader, a speech generating devices and other assistive technologies so that there are parallels between accessibility and usability in developing websites for the different user groups. The principles of universal design can be applied by making websites more accessible and useable [20]. Therefore, the design of accessible website should be integrated into universal design as well as complied with web accessibility standard.

Table 2: Home Pages compliance with W3C 2.0 level A

	Error	Accessibility	Compatibility	Compliance	Search	Standards	Usability
Average	2.26	11.11	3.16	1.26	4.89	33.26	6.79
Median	2.00	10.00	3.00	2.00	5.00	40.00	6.00
Min	0.00	1.00	0.00	0.00	2.00	0.00	4.00
Max	7.00	21.00	6.00	2.00	9.00	60.00	13.00

Table 3: Selected pages compliance with W3C 2.0 level A

	Error	Accessibility	Compatibility	Compliance	Search	Standards	Usability
Average	1.56	8.11	2.61	1.06	4.00	17.94	6.56
Median	1.00	8.00	2.00	1.00	4.00	15.50	6.50
Min	0.00	1.00	0.00	0.00	1.00	0.00	2.0
Max	4.00	17.00	6.00	2.00	8.00	50.00	12.00

The similar result was shown when evaluate the same web pages with TAW. All pages fail to meet WCAG. TAW reported that the common correction was perceivable (53%) followed by robust (26%) and operable (15%) (Figure 2). The most errors were critical as they related to perceivable principle in WCAG. The problem is solved by the awareness of web developers when they design web contents. For example, WCAG suggests that text alternatives should be provided for non-text content [29]. Screen reader attempts to identify and interpret what is being displayed on the screen for people who are blind or vision impaired. Therefore, if web developers provide text alternatives in non-text so that screen readers can read any web contents that mean people who are blind or vision impaired can access to all information on websites.

■ Perceivable ■ Operable ■ Understandable ■ Robust

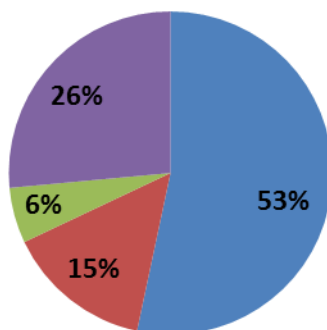


Figure 2: Corrections are needed in web pages

3.2 Manual evaluation

Ministry of Social Development and Human Security (E-smartcard for people with disabilities) and Ministry of Education (Education center for people with disabilities) are the highest total score at 7 from 15 in manual test. The result is not surprising because those websites deliver service for people with disabilities so that they have to pay high attention to develop accessible online materials. However, all the websites failed to meet WCAG in manual check. The average score is 5. The significance of a score of 5 is that all the websites would be accessibility problems. The most error related to media presentations. All of the websites got zero score in media checkpoint. Again, if websites provide prerecorded media with alternative forms such as caption, text description and sign language interpretation therefore, people with vision impairment or people who are deaf or hearing impairment can understand the content of media. Another notable failure is the level of contrast ratio in text and background. WCAG suggests that text and images of text are required the ratio at 4:5 for regular text and 3:1 for large text. However, some websites present specific colors which do not meet WCAG. For example, organization color is dark blue then web developers use dark blue text on a light blue background. The contrast ratio is 2.32:1 so the website fails to meet requirements. Ordinary people may not face this issue however; people with color vision deficiency have difficulty seeing web contents. Consequently, web developer should have skills and knowledge to ensure that a website is accessible to people with special needs.

The highlight is that some websites show WCAG logo (Figure 3) in pages. In other words, those websites complied with WCAG. However, the results show that the website would have accessibility issues. For example, one of selected websites which presents WCAG logo all pages, failed to meet 1.2.2 (Captions) and 1.2.3 (Audio Description or Media Alternative). Alternative forms are not provided in the latest video. The cause of a problem may be because web staffs have a low level of awareness of web accessibility when update information.



Figure 3: WCAG logo

Thai government may need to find ways to assist government agencies improve the accessibility of websites. One solution is that

“e-Government initiatives must not only be required to conform to the Web Content Accessibility Guidelines (WCAG) 2.0 from W3C's Web Accessibility Initiative (WAI), but must validate conformance and maintain the standard over time. Only in that way can government maintained Web content and applications ensure access by all citizens. In addition, government bodies must be given the training and understanding to develop partnership and purchasing requirements that reflect the need for partners and vendors to conform as well”[30].

From the literature studied, it is clear that keys to successful accessibility in e-government incorporates with raising awareness of web accessibility guidelines, providing education and training and, affordability of equipment and technology. Many researchers such as Jane [21], Maher [3], and Shadi and Shawn [1] also support those solutions.

It is possible to notice that Thai government has provided web accessibility policy and TWACAG guideline; however, those action plans are only the standards & codes of practice, thus it can cause of failure to promote web accessibility in Thailand. There are success case laws regarding web accessibility in many countries. For example, the case law of Bruce Maguire who sued over inaccessible online materials in the official Sydney Olympics website, provoked the important of web accessibility in Australia [9]. Consequently, increasing regulation's enforcement may be an alternative solution.

Lastly, providing clear policy and monitor plan may be drivers exist. For example, Australian government websites are required to pass level A and AA by the end of 2012 and 2014 respectively therefore, agencies are encouraged to meet WCAG within the timeframes [8].

4. Conclusion

The successful implementation of web accessibility in e-government would benefits all citizens including people with disabilities. In this paper we explored the level of web accessibility in e-government in Thailand. The results show that there is a significant probability Thai e-government lack awareness of web accessibility and web developers maintain websites with low levels of accessibility. Consequently, increasing the awareness of web accessibility guideline and raising government effort may be simple solutions for this situation.

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6. References

- [1] Abou-Zahra, S., & Henry, S. L. (2010). *Exploring web accessibility solutions in developing regions as innovations for the benefit of all*. Paper presented at the Proceedings of the 2010 International Cross Disciplinary Conference on Web Accessibility (W4A), Raleigh, North Carolina.
- [2] Adienne, V. (2011). Thailand to offer all government services online by 2015, *ASIA PACIFIC FUTURE GOV*. Retrieved from <http://www.futuregov.asia/articles/2011/aug/18/thailand-targets-all-purpose-website-2015/>
- [3] Al-Fakhri, M. O., Cropf, R. A., Kelly, P., & Higgs, G. (2008). E-government in Saudi Arabia: between promise and reality. *International Journal of Electronic Government Research (IJEGR)*, 4(2), 59-85.
- [4] Al-Khalifa, H. (2012). The accessibility of Saudi Arabia government Web sites: an exploratory study. *Universal Access in the Information Society*, 11(2), 201-210. doi: 10.1007/s10209-010-0215-7
- [5] Caldwell, B., Chisholm, W., Slatin, J., Vanderheiden, G., & White, J. (2006). Web content accessibility guidelines 2.0. *W3C working draft*, 27.
- [6] Chris, P. (2007). Firefox web development toolbar, from <https://addons.mozilla.org/en-US/firefox/addon/web-developer/?src=search>
- [7] CIS and G3ict. (2012). Web Accessibility Policy Making : An International Perspective.
- [8] Communications and Public Affairs. (2012). Australian Government Web Guide, from <http://webguide.gov.au/accessibility-usability/accessibility/>
- [9] Darcy, S. (2003). The politics of disability and access: the Sydney 2000 Games experience. *Disability & Society*, 18(6), 737-757. doi: 10.1080/0968759032000119497
- [10] EGA. (2013). *Government Website Standard*. Retrieved from <http://www.ega.or.th>.
- [11] ICTC Technology Centre. (n.d.). TAW, from <http://www.tawdis.net/>
- [12] Initiative, W. A. (2009). W3C. *Online at http://www.w3.org/WAI/*. Visited August.
- [13] Kuakiatwong, S. (2010). *Evaluating Web Accessibility and Usability at Thailand Cyber University for Totally Blind Users*. Paper presented at the World Conference on E-Learning in Corporate, Government, Healthcare, and Higher Education 2010, Orlando, Florida, USA. <http://www.editlib.org/p/35832>

- [14] Lee, S., Kim, B., & Kim, J. (2007). Accessibility Evaluation of Korean e-Government. In C. Stephanidis (Ed.), *Universal Access in Human-Computer Interaction. Applications and Services* (Vol. 4556, pp. 73-78): Springer Berlin Heidelberg.
- [15] Ministry of Information and Communication Technology. (2011). Thailand Information and Communication Technology (ICT) Policy Framework (2011-2020).
- [16] Ministry of Information Communication Technology. (2008). Thai Web Content Accessibility Guide 2008.
- [17] Mozilla Corporation. (2013).
- [18] Organization, W. H. (2011). *World report on disability*: World Health Organization.
- [19] Powermapper software. (2013). SortSite.
- [20] Sapp, W. (2009). Universal Design: Online Educational Media for Students with Disabilities. *Journal of Visual Impairment & Blindness*, 103(8), 495-500.
- [21] Seale, J. (2006). A contextualised model of accessible e-learning practice in higher education institutions. *Australasian Journal of Educational Technology*, 22(2), 268.
- [22] Sohaib, O., Hussain, W., & Khan, Q. (2012). Exploring the relationship between Web Usability and the Web Accessibility Guidelines': unpublished.
- [23] Steve, F., Jun, & WAT-C. (n.d.). Colour Contrast Analyser 2.2 for Web Pages, from <http://www.visionaustralia.org/business-and-professionals/digital-access/resources/tools-to-download/colour-contrast-analyser-2-2-for-web-pages#download>
- [24] Sukasame, N. (2004). The development of e-service in Thai government. *BU Academic Review*, 3(1), 17-24.
- [25] The United Nations. (n.d.). Convention and Optional Protocol Signatures and Ratifications, from <https://www.un.org/disabilities/countries.asp?id=166>
- [26] Tom, J. (2009). Manual accessibility evaluation, from <http://www.tomjewett.com/accessibility/evaluation.html>
- [27] UN, E. (2012). Government Survey 2012: E-Government for People. *Department Economic and Social Affairs, United Nations, New York*.
- [28] Vigo, M., Brown, J., & Conway, V. (2013). *Benchmarking web accessibility evaluation tools: measuring the harm of sole reliance on automated tests*. Paper presented at the Proceedings of the 10th International Cross-Disciplinary Conference on Web Accessibility, Rio de Janeiro, Brazil.
- [29] W3C. (2008). Web Content Accessibility Guidelines (WCAG) 2.0, from <http://www.w3.org/TR/WCAG20/#conformance-reqs>
- [30] W3C. (2009). Improving Access to Government through Better Use of the Web, from <http://www.w3.org/TR/egov-improving/>
- [31] W3C. (2013). Website Accessibility Conformance Evaluation Methodology (WCAG-EM) 1.0, from <http://www.w3.org/TR/WCAG-EM/#step2>