A STUDY OF ACCESSIBLE WEBSITES FOR BLIND USERS IN THAILAND

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A STUDY OF ACCESSIBLE WEBSITES FOR BLIND USERS IN THAILAND

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ABSTRACT

The objective of the study was to survey the number of accessible websites for blind users in Thailand and also explore various kinds of web accessibility problems that could be found by different evaluation methods. The samples were 385 popular websites from 5 categories, ranked and classified by Thailand web directory and web statistics from Truehits.net in December 2009. All samples were assessed by evaluation software named A-prompt prior to a manual checking through Web Content Accessibility Guidelines (WCAG). Subsequently, the laboratory study with 5 participants was conducted to understand the real situation that blind users have to confront while browsing a website.

The study showed that 7 websites from 385 websites were accessible (1.81%). Various types of web accessibility problems were identified by evaluation software. The problem mostly found in this study was “image missing alternate text” (73.69%), followed by “link missing alternate text” (20.66%) and “form label missing” (4.08%) respectively. Afterwards, as a result of manual checking, the findings showed a smaller number of images missing alternate text in government websites and business websites. While the problems of misspelling of words, which could not be identified by the evaluation software, were found in business websites and entertainment websites.

For laboratory study, all participants reported that the problems of images missing alternate text were found in most websites, which corresponds to the findings from evaluation software and manual checking. However, the exact number of problems could not be identified by blind users due to different browsing habits. Nevertheless, the advantage of this evaluation method was the ability to detect unique problems that could only be found by blind users, such as improper alteration between English and Thai language.

In conclusion, because of the variation in performance of problems found among various evaluation methods, the combination of findings by all methods is necessary for better insight in exploring web accessibility problems. No single evaluation method could be counted on solely. The web designer or web developer should rely upon a lightweight method in the preliminary stage, such as evaluation software. Then gradually gather up experts’ comments and blind users’ opinions to improve the accessibility later on.

KEY WORDS: ACCESSIBLE/ WEBSITES/ BLIND USERS

88 pages

การศึกษาเว็บไซต์ที่เข้าถึงได้สำหรับคนตาบอดในประเทศไทย

A STUDY OF ACCESSIBLE WEBSITES FOR BLIND USERS IN THAILAND

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บทคัดย่อ

วัตถุประสงค์ของการศึกษาครั้งนี้เพื่อสำรวจจำนวนของเว็บไซต์ที่เข้าถึงได้สำหรับคนตาบอดในประเทศไทยและศึกษาถึงปัญหาในการเข้าถึงเว็บไซต์ที่สามารถพบได้จากการประเมินด้วยวิธีต่างๆ กลุ่มตัวอย่างในการศึกษานี้คือเว็บไซต์จำนวน 385 เว็บ จากเว็บไซต์ 5 หมวด ซึ่งแยกหมวดและจัดอันดับความนิยมจาก Truehits.net ผู้รวบรวมรายนามและสถิติเว็บไซต์ของประเทศไทยในช่วงเดือนธันวาคม ปี พ.ศ. 2552 โดยนำกลุ่มตัวอย่างมาประเมินการเข้าถึงได้ด้วยโปรแกรม A-prompt ก่อนที่จะประเมินเพิ่มเติมโดยใช้คนตรวจตามเกณฑ์ WCAG จากนั้นจึงทดสอบเว็บไซต์โดยผู้เข้าร่วมวิจัย 5 คน เพื่อให้เข้าใจถึงปัญหาที่คนตาบอดประสบในการท่องเว็บไซต์

ผลการศึกษาพบว่ามีเว็บไซต์ที่เข้าถึงได้ 7 เว็บจากจำนวน 385 เว็บ คิดเป็น 1.81% ปัญหาในการเข้าถึงเว็บไซต์ที่พบมากที่สุดจากการประเมินด้วยโปรแกรม A-prompt คือการใช้รูปภาพที่ไม่มีคำอธิบาย (73.69%) รองลงมาคือการใช้จุดเชื่อมโยงที่ไม่มีคำอธิบาย (20.66%) และการใช้แบบฟอร์มกรอกข้อมูลที่ไม่ระบุหัวข้อ (4.08%) ตามลำดับ หลังจากนั้น ผลจากการตรวจตามเกณฑ์ WCAG ด้วยคน พบว่าเว็บไซต์หมวดภาครัฐและหมวดธุรกิจมีจำนวนปัญหาการใช้ภาพที่ไม่มีคำอธิบายน้อยกว่า ในขณะที่พบปัญหาการสะกดคำผิดเพิ่มเติมในเว็บไซต์หมวดธุรกิจและหมวดบันเทิง ในการประเมินการเข้าถึงเว็บไซต์โดยผู้เข้าร่วมวิจัย ผลปรากฏว่าพบปัญหาการใช้ภาพที่ไม่มีคำอธิบายในเว็บส่วนใหญ่ แม้จะไม่สามารถระบุจำนวนปัญหาที่แน่นอนได้เนื่องจากพฤติกรรมการท่องเว็บที่แตกต่างกัน ข้อได้เปรียบของการประเมินวิธีนี้คือการตรวจพบปัญหาที่ไม่สามารถตรวจพบได้ด้วยวิธีประเมินอื่นๆ เช่น การสลับระหว่างภาษาไทยและภาษาอังกฤษอย่างไม่เหมาะสม

ผลสรุปจากการใช้วิธีการประเมินการเข้าถึงเว็บไซต์ต่างๆ กัน พบว่าผู้ออกแบบเว็บไซต์ควรอาศัยข้อมูลที่ได้จากแต่ละวิธีมารวมกันเพื่อออกแบบเว็บไซต์ให้เข้าถึงได้ เช่น เลือกใช้โปรแกรมประเมินก่อนในเบื้องต้น จากนั้นจึงอาศัยผู้เชี่ยวชาญและคนตาบอดมาทดสอบต่อไป

88 หน้า

CONTENTS

CONTENTS (cont.)

LIST OF TABLES

LIST OF FIGURES

CHAPTER I
INTRODUCTION

1. Background of the study

The World Wide Web has become a significant information resource for everyone including the blind. Computer users who are blind or blind users normally use an assistive technology called screen reader for accessing computer applications. A screen reader is the software that interprets the information displayed on the screen and sends to a text-to-speech synthesizer or to a Braille display. But not every website was properly designed for blind users. Due to a deficiency of evidence to present a web accessibility level, most of web designers and web developers are still unaware of the problem that blind users are facing. This ignorance could lead to the situation of more inaccessible websites in the future.

Only few studies have been conducted on this issue during the past decade. For example, there is a study on the web accessibility of 50 most popular websites in the United States of America. This study found that more than half of these websites were not accessible especially for blind users (Sullivan and Matson, 2000). Another research conducted in 2005 into the current level of web accessibility in China reported that none of Chinese websites was compliant with Web Content Accessibility Guidelines (WCAG), in spite of the fact that these selected websites were meant to be information portals for blind users (Lisney, Li and Liu, 2007).

For Thailand, web accessibility has started to become an important issue by the effort of Ministry of Information Communication Technology in 2003. The government has been planning to develop an e-government system to provide a service through websites. A preliminary survey on the government websites in 2007 reported that only 1% of government websites were accessible (Mitsamarn, Gestubtim and Junnatas, 2007). The scope of study of Mitsamarn, Gestubtim and Junnatas was

limited to government websites only, which cannot represent the real situation that blind users are facing with the problems of accessibility of most websites. Therefore, more investigation on web accessibility of overall websites should be conducted regarding that blind users need to access all kinds of websites as equally as other users.

This study was intended to survey various kinds of websites from Thailand web directory and web statistics at Truehits.net with the total number of 10,000 websites. The sample size was determined by using Taro Yamane's formula (Yamane, 1967). After applying the formula, the result of the sample size was 385 websites which were divided into 5 categories in the same manner as Petrie, Hamilton and King's research (2004), namely;

1. Government websites
2. Business websites
3. Education websites
4. Entertainment websites
5. Other websites such as discussion boards, portals and Internet services providers.

The 77 sample websites in each category were chosen by popularity ranking reported monthly online and were evaluated for the level of accessibility by using web accessibility evaluation software called A-Prompt. The results from this test presented the number of accessible websites in Thailand. Furthermore, an in-depth study about web accessibility problems exclusively for blind users were conducted with 5 websites (the most popular website of each category) by using 2 different methods; a web accessibility manual check through WCAG and a laboratory study by blind users.

Web accessibility problems that blind users encounter in accessing a website could range from annoyances that only waste more time to severe problems that force blind users to quit a task. For example, an image without any explanation is not accessible for blind users. The accessibility problems of each website were reported by using the web accessibility evaluation software, and the problems that

affected blind users directly were categorized by using manual checking through Web Content Accessibility Guidelines (WCAG). However, neither web accessibility evaluation software, nor manual checking alone, is sufficient to certify web accessibility for blind users (Ivory and Chevalier, 2002). Web accessibility evaluation need to include laboratory study to get a better understanding of the problems that blind users have to deal with (Clark, 2002). The discussion of the results presented both quantity and type of web accessibility problems that different evaluation methods were able to find.

2. Objectives of the study

2.1 To survey a number of accessible websites based on popularity ranking in Thailand.

2.2 To study web accessibility problems for blind users that can be found by using a web accessibility evaluation software and manual checking through WCAG.

2.3 To study web accessibility problems for blind users that can be found by using laboratory study with 5 blind users.

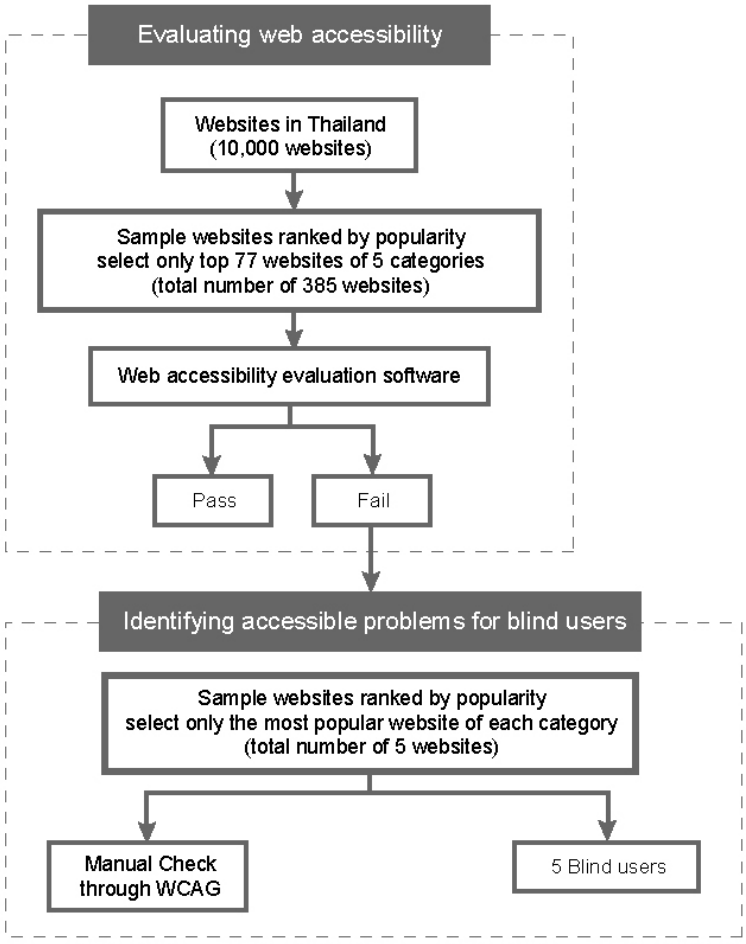

Figure1.1 Conceptual framework

3. Research questions

3.1 How many accessible websites are there based on popularity ranking in Thailand?

3.2 What kind of web accessibility problems for blind users can be found by using a web accessibility evaluation software and manual checking through WCAG?

3.3 What kind of web accessibility problems for blind users can be found by using laboratory study with 5 blind users?

4. Scope of research

Based on the list of Thailand's web directory shown in popular ranking of December 2009 from Truehits.net, there were 10,000 websites in the directory listed in various categories. Since the number of websites keep growing in the fast pace and not all of them were frequently visited by most users, the sample size of 385 websites were determined by using Taro Yamane's formula (Yamane, 1967). The latter part of the study examined 5 websites chosen from the most popular website of each category.

5. Definition of terms

5.1 Accessible website: A website that is usable by people of all abilities and disabilities. When websites are correctly designed, developed and edited, all users can have the ability to equally access the information and its functionality.

5.2 Web accessibility problem: A state of dealing with difficulty while browsing a website due to a lack of ability to perceive web's content or control the event that happen on the website.

5.3 Blind user: A person with severe visual impairment who browses through website by using screen reader software instead of visual perception.

5.4 Screen reader: A software that interprets the information displayed on the screen and sends to a text-to-speech synthesizer or to a Braille display. In this study, JAWS version 10.0 developed by Freedom Scientific Company Limited and Tatip developed by PPA Innovation Company Limited was selected.

5.5 Evaluation software: A software for assessing a website, determining the level of accessibility and also presenting web accessibility problem. In this study, A-prompt version 1.0.6 developed by the University of Toronto was selected.

5.6 Manual check: A process of examining a website in particular subjects that could only judge by human after following the warning reported from A-prompt evaluation software.

6. Expected results

6.1 To obtain the empirical evidence of the actual situation of web accessibility in Thailand, especially for blind users.

6.2 The findings will enable web designers and web developers to realize the importance of developing their websites with higher degree of accessibility in order to attract more users, including blind users.

CHAPTER II
LITERATURE REVIEW

On “A study of accessible websites for blind users in Thailand”, the theories and related studies were reviewed to be guidance of the study as follows;

1. The Internet and blind users
2. Web accessibility for blind users
3. Web Content Accessibility Guidelines (WCAG)
4. Thailand Web Content Accessibility Guidelines (Th-WCAG)
5. Thai Web Content Accessibility Guide 2008 (TWCAG2008)
6. Web accessibility evaluation software
7. Related domestic and international studies

1. The Internet and blind users

As access to Internet increases, so will use of the Internet in daily life. For example, companies providing a channel for their customers to purchase their products online or for universities to provide their students Internet-based registration system. Therefore, it is becoming increasingly advantageous to be able to find information on the Internet efficiently. These benefits are meant to provide convenience for all users, including blind users. Approximately 196,000 people with severe visual impairment in the United States of America were reported to have access to the Internet, and half of those were considered as regular computer users. The number of blind users keeps increasing since those statistics have been published (Mankoff, Fait and Tran, 2005).

While the survey of Internet user from Internet World Stats shows that there are more than 1.6 million blind users in Europe continent and the numbers are expected to grow rapidly (E-consultancy, 2006).

Blind users can access the information in the websites by using assistive technologies, which enable blind users to acquire information in 2 ways other than using their vision to read the monitor like other users do. The outputs, as a result of the assistive technologies are:

1. *Speech output:* a system provided by screen reader software that translates content that display on screen into synthetic speech.

2. *Braille output:* a hardware device which contains a strip of refreshable Braille pins. After obtaining data from the screen, this device will transform the content into Braille characters for user to touch.

The screen reader software, also commonly known as a text-to-speech synthesizer, has greater majority of users comparing to Braille output option because not all of blind person are able to understand Braille language. Also, the price of speech output software is more affordable than the Braille output hardware. The screen reader software could be compared as a sighted companion for blind user by reading out the contents and events that happen on the screen, such as menu list, heading and text (King, 2004).

The severe constraint on browsing website by blind users is that they have to rely on hearing solely, instead of using their visual perception. According to the limitation of listening to each web's content one line at a time, blind users are unable to understand the structure of the entire website before they explore them. This is the problem that usually occurs whenever blind users have to confront with an unfamiliar interface. Moreover, blind users are forced to listen to an enormous amount of text while sighted users are able to gain the same amount of information in a quick glance. Sighted users can look through a website by scanning for some interesting keywords because they can see the headings at once. Although, blind users can choose to jump from heading to heading by using shortcut keys, they still need to wait for the slower screen reader to speak the heading aloud one by one (King, 2004).

2. Web accessibility for blind users

As a result of vision loss, website that requires visual perception will become inaccessible for blind users. Blind users mostly use a screen reader as their assistive technology to access the information on websites which is a disadvantage to them since no other alternatives are adequately provided for visual content. When blind users who use a screen reader reach an image while reading a page, the screen reader will pronounce a text description provided for the image instead of the visual information they cannot see. If the web designers or web developers disregarded to provide any description, then the screen reader will either read the filename of the image or become silent. If the image contained important information, then this information is not accessible for the blind users (Bigham, 2007).

Instructors of web design classes also accepted that web accessibility for blind users should be taught to the future web designers at the beginning. Since most of students are currently designing a website based on a type of GUI (Graphical User Interface) design and expecting all users to browse the web by using mouse rather than keyboard. Web designers are surprised to know that blind users can also browse the web. Once the web designers learned how to browse a website with a screen reader, they find out the way to prevent the accessibility problems of website by adding alternate texts to those visual elements (Rosmaita, 2006). Some web designers misunderstand that making an accessible website means using no image at all or generating equivalent text-only pages as an option for blind users. But the truth is, providing an alternate text is a basic solution to enhance the accessibility level of the websites (Jackson, 2003).

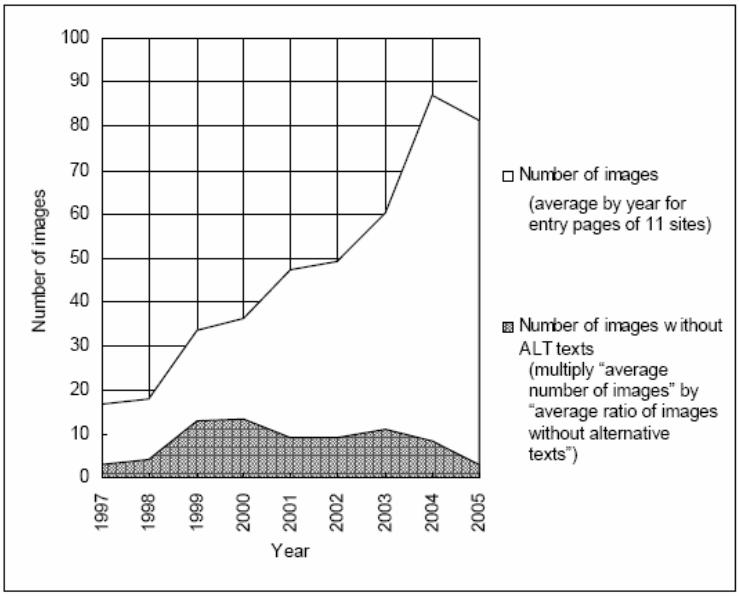

Figure 2.1 The increasing of images used in websites and transition of the number of images without alternative texts (Asakawa, 2005).

Figure 2.1 showed the annual average number of images used in 11 selected websites over the past 9 years. The findings showed that the number of images has increased more than four times during this period of time. If there are no alternate texts for these images, blind users will lose a lot of the information presented in a form of visual element. Alternate texts are extremely important for blind users to acquire the information from websites and to browse through websites. All the accessibility regulations such as Web Content Accessibility Guidelines (WCAG) or US Section 508 request that websites need to prepare alternate texts whenever images are used. Figure 2.1 also showed the number of missing alternate texts in selected websites which increased from 1997 to 2000. However, it suddenly decreased in 2001 from 38% in 2000 to 19% in 2001. The results indicated that all images on 5 selected government websites had alternate texts as a result of US Section 508 regulations that became effective in June of 2001. In 2004, it appeared that private companies also started to provide alternate texts for their websites. The number of missing alternate text decreased to 7% in 2005. Although, the use of images has increased steadily but the ratio for missing alternate texts has been decreasing quite consistently since 2000. The findings indicated that web accessibility has gradually improved (Asakawa, 2005).

3. Web Content Accessibility Guidelines (WCAG)

Web Content Accessibility Guidelines (WCAG) is a list of guidelines to make website accessible to people with disabilities. The guidelines are intended for all web designers and web developers to follow as a manual for creating or improving the accessibility of websites. The main purpose of these guidelines is to promote web accessibility for everyone. Web content should be accessible for all users, no matter which user interface they are using such as desktop browser, voice browser, mobile phone or automobile-based personal computer. Despite different constraints that users might be confront such as noisy surroundings, over-illuminated rooms or in a hands-free environment. Following WCAG will also help users to find information on the website easier and quicker. These guidelines are not meant to discourage web developers from using image or multimedia, but rather explain how to make these contents more accessible to a wide user group (World Wide Web Consortium, 1999).

The WCAG 1.0 contains a total of 14 accessibility guidelines, each of which has one or more specific checkpoints associated with it. Each checkpoint explains how a particular guideline applies in a typical content development scenario; checkpoints are divided into 3 groups:

1. Priority 1 checkpoints; which **must** be satisfied
2. Priority 2 checkpoints, which **should** be satisfied
3. Priority 3 checkpoints, which **may** be satisfied

WCAG Priority 1 checkpoints provide the basic, minimal standard for accessibility. "Single A" conformance with the WCAG indicates that the site has met a minimum standard for content accessibility by satisfying all applicable Priority 1 checkpoints. Similarly, "Double A" conformance indicates satisfaction of all applicable Priority 1 and Priority 2 checkpoints, and "Triple A" conformance indicates satisfaction of all applicable checkpoints.

Priority 1 checkpoints are the focus of the present study because they represent a minimum standard for content accessibility. There are a total of 16 Priority 1 checkpoints as shown;

1. Provide a text equivalent for every non-text element.
2. Ensure that all information conveyed with color is also available without color, for example from context or markup.
3. Clearly identify changes in the natural language of a document's text and any text equivalents.
4. Organize documents so they may be read without style sheets. For example, when an HTML document is rendered without associated style sheets, it must still be possible to read the document.
5. Ensure that equivalents for dynamic content are updated when the dynamic content changes.
6. Until user agents allow users to control flickering, avoid causing the screen to flicker.
7. Use the clearest and simplest language appropriate for a site's content.
8. Provide redundant text links for each active region of a server-side image map.
9. Provide client-side image maps instead of server-side image maps except where the regions cannot be defined with an available geometric shape.
10. For data tables, identify row and column headers.
11. For data tables that have two or more logical levels of row or column headers, use markup to associate data cells and header cells.
12. Title each frame to facilitate frame identification and navigation.
13. Ensure that pages are usable when scripts, applets, or other programmatic objects are turned off or not supported. If this is not possible, provide equivalent information on an alternative accessible page.

14. Until user agents can automatically read aloud the text equivalent of a visual track, provide an auditory description of the important information of the visual track of a multimedia presentation.

15. For any time-based multimedia presentation, synchronize equivalent alternatives with the presentation.

16. If, after best efforts, you cannot create an accessible page, provide a link to an alternative page that uses W3C technologies, is accessible, has equivalent information and is updated as often as the inaccessible page (World Wide Web Consortium, 1999).

4. Thailand Web Content Accessibility Guidelines (Th-WCAG)

Th-WCAG, stands for Thailand Web Content Accessibility Guideline, is a national web accessibility guideline for web developers in Thailand. The guideline is a modified version of Level 1 of WCAG 2.0 under W3C that has been adjusted to suit the circumstance in Thailand. The guidelines of Th-WCAG are shown as follows;

1. Provide a text equivalent for every image.

2. Provide a text equivalent for every object.

3. Provide a text equivalent for every script.

4. Provide a text equivalent a title each frame.

5. Captions are provided for prerecorded multimedia.

6. Information and relationships conveyed through presentation can be programmatically determined, and notification of changes to these is available to user agents, including assistive technologies.

7. Using table markup to present tabular information.

8. Using label elements to associate text labels with form controls.

9. Any information that is conveyed by color is also visually evident without color.
10. All functionality of the content is operable in a non-time-dependent manner through a keyboard interface, except where the task requires analog, time-dependent input.
11. For each time-out that is a function of the content, user is allowed to deactivate the time-out.
12. Content does not violate the general flash threshold or the red flash threshold.
13. A mechanism is available to bypass blocks of content that are repeated on multiple Web units.
14. If an input error is detected, the error is identified and described to the user in text.
15. When any component receives focus, it does not cause a change of context.
16. Web units or authored components can be parsed unambiguously, and the relationships in the resulting data structure are also unambiguous.
17. Text or diagrams, and their background, have a luminosity contrast ratio of at least 5:1.
18. Content does not blink for more than three seconds, or a method is available to stop all blinking content in the Web unit or authored component.
19. Web units have titles.
20. Titles, headings, and labels are descriptive.

21. The purpose of each link can be programmatically determined from the link.

22. Changes of context are initiated only by user request (Mitsamarn, Gestubtim and Junnatas, 2007).

5. Thai Web Content Accessibility Guide 2008 (TWCAG 2008)

Thai Web Content Accessibility Guide 2008 or TWCAG 2008 is the standard guidelines for developing accessible website, provided by the effort of Ministry of Information and Communication Technology. The principles of TWCAG 2008 are divided into 4 sections as follows;

1. Perceivable
    - 1.1 Provide text alternatives for any non-text content so that it can be changed into other forms people need, such as large print, Braille, speech, symbols or simpler language.
    - 1.2 Provide alternatives for time-based media.
    - 1.3 Create content that can be presented in different ways without losing information or structure.
    - 1.4 Make it easier for users to see and hear content including separating foreground from background.
2. Operable
    - 2.1 Make all functionality available from a keyboard.
    - 2.2 Provide users enough time to read and use content.
    - 2.3 Do not design content in a way that is known to cause seizures.
    - 2.4 Provide ways to help users navigate, find content, and determine where they are.

3. Understandable

3.1 Make text content readable and understandable.

3.2 Make Web pages appear and operate in predictable ways.

3.3 Help users avoid and correct mistakes.

4. Robust

4.1 Maximize compatibility with current and future user agents, including assistive technologies (Srisom, 2008).

6. Web accessibility evaluation software

A-prompt is an accessibility evaluation software and repair tool developed by the Adaptive Technology Resource Centre of the University of Toronto. It is internationally well-known by displaying the results in many languages such as English, French, German and Korean. A-prompt's ability is not only evaluating websites to find accessibility problems but also repairing those problems at the same time. A-prompt performs the assessment based on guidelines established by the Web Accessibility Initiative (WAI) – from the World Wide Web Consortium (W3C). It enables web designers or web developers to select individual files from each website for evaluation and repair. After detecting accessibility problems, A-prompt will display the necessary dialog boxes to guide users step-by-step through the repair process (Ridpath, 2001).

A-prompt is considered as one of the most popular evaluation software for testing accessibility conformance level of websites. Comparing to Bobby, the other evaluation software developed by Watchfire Company Limited, there are some differences between these two programs. A-prompt is designed to be embedded within an HTML editor by urging the web designers or web developers for accessible HTML code enhancements. It indicates the types and locations of accessibility problems in each website then displays a warning message to let the web designers or web developers fix the problem immediately. While Bobby, a java-based program,

provides an accessibility evaluation service that examines and provides reporting status on accessibility problems, but the repair process are not automatically available. A-prompt is considered over Bobby for its ability of assessing color contrast, missing script section, link text that may not be meaningful and missing skip over navigations (Edwards, 2001).

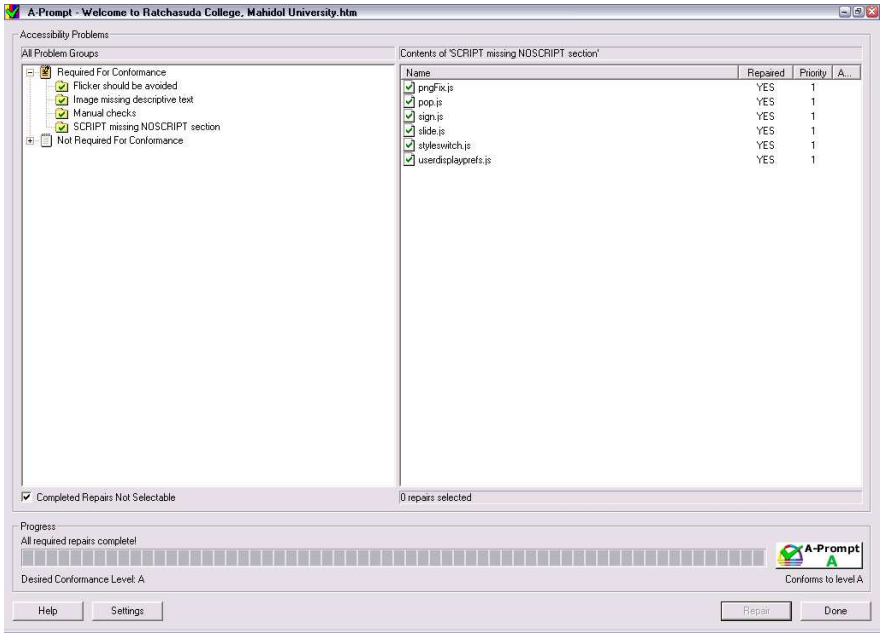

Figure 2.2 User interface of A-prompt web accessibility evaluation software

7. Related domestic and international studies

Atchara Suwannakin (2003) has studied the behavior and needs to access information through the Internet of persons with visual impairment in Bangkok and Vicinity. The findings from this study showed that the main purpose of using the Internet was to search for information. A majority used the Internet to increase their knowledge and download programs. On problems and barriers of accessing information through the Internet, most of the blind users had problems with the format of the presentation on the screen and problem of using English as the media to access information (Suwannakin, 2003).

A study entitled “The potential of web accessibility in China: a hypothesis on its impact on the global web interface” is based on a preliminary research conducted in 2005 to indicate the current level of web accessibility in China. The study evaluated 8 selected websites which are meant to be information portals for the visually impaired. Results of the evaluations showed that none of the selected websites is compliant with “Level A” of WCAG 1.0 (Web Content Accessibility Guidelines). Therefore, all of them are considered as inaccessible websites. Causes behind this situation may include lack of regulations from the government and lack of accessibility awareness of web designers. Moreover, Chinese web accessibility also faces the challenge of the diversity and complication of Chinese language (Lisney, Li and Liu, 2007).

A survey in accessibility of government websites in Taiwan has been conducted annually. In 2005, the assessment of 35 selected websites showed that only 28 websites passed Priority 1 of WCAG. The most commonly problems found in 2005 were similar to the problems reported in 2004. For example, problems of providing summaries for tables, problems of providing space to separate adjacent links, problems of identifying the language of the text, problems of using relative sizing and positioning, problems of using a public text identifier in a DOCTYPE statement, problems of providing a text equivalent for every image, and problems of assuring that event handlers can operate without a mouse (Chen and Shao, 2005).

Another study on web accessibility in the United states of America has examined the accessibility and usability of 50 most popular websites, The results suggested that a meaningful ordinal ranking of web accessibility is significantly correlate with the results of web usability assessment procedures. The diversity of Internet users with different level of disabilities has increased the need for applying universal design principles to design or develop an accessible website. The study reported that www.amazon.com, ranked as the most popular commercial website, was also get the highest vote for accessibility level for most users (Sullivan and Matson, 2000).

Interesting findings from a survey on webmaster perceptions about web accessibility showed that there are still many inaccessible websites, even there are

various evaluation software and guidelines to help the web designers and web developers in making their websites more accessible. The data was collected from 175 webmasters. The results indicated their knowledge on the topic of web accessibility and the reasons for being unable to create an accessible website. The findings were vary from a lack of time, a lack of training, a lack of managerial support, a lack of client support, improper evaluation software, and confusing accessibility guidelines (Lazar, Dudley-Sponaugle and Greenidge, 2004).

In 2006, Brain J. Rosmaita presented a study on setting the new approach for web design course by placing the issue of creating accessible website for blind users at the beginning of a course. The purpose of the study was to emphasize the importance and benefits of web accessibility to provide web design students with the motivation to implement accessible web design. The new approach that was mentioned in this study is to let the students browse a website with the monitor turned off and listen to the screen reader instead. The new course outline was based on personal experience of each student. It presented a concrete reason and a practical model to create an accessible website in the future. (Rosmaita, 2006)

A comparative study of methods for assessing web accessibility for blind users has conducted by Mankoff, Fait and Tran in 2005. The study used 4 different evaluation methods, namely; Expert Review, Screen Reader, Automated and Remote, to find the accessibility problems that affect blind users in particular. The result showed that the evaluation method called “Screen Reader” is the most consistently successful at finding accessibility problems. The “Screen Reader” required a group of web designers or web developers to browse a website by using screen reader and turning the monitor off. The study also claimed that a laboratory study with blind users is too difficult and expensive to operate (Mankoff, Fait and Tran, 2005).

Clark (2002) referred to user testing as a common usability method proven effective for finding accessibility problems. Unfortunately, user testing with disabled persons was assumed to be too difficult to perform due to the limited financial resources of a web designer and a lack of interest from the investor. It was also believed that user testing will consume more time than other methods (Clark, 2002).

Neilsen and Landauer (2000) argued that evaluating website with users can rely on the results which come from 5 users only because most of the accessibility problems would appear repeatedly. Researcher would gain more information about web accessibility problems by running many small tests rather than running a large number of users which they cannot afford. According to the purpose of user testing which intend to help web designers and web developers in designing an accessible website, but not intend to discourage them by determining as many problems as possible (Neilsen and Landauer, 2000).

Neilsen and Pernice (2001) also presented the results of web accessibility and usability tests of 19 websites by blind users and motor-impaired users. The selected websites in this report not only presented good examples of web design, but also pointed out the design that caused difficulties for users with disabilities. The findings addressed that although some websites were considered as accessible, but they can still be very hard to use. For example, the websites which provided alternate texts for all images were able to technically pass the web accessibility test by evaluation software but blind users still cannot understand the meaning of those images. Therefore, the appropriate way to implement alternate text would play an important role in improving the quality of web design (Neilsen and Pernice, 2001).

According to another study on alternative text's quality by Bigham in 2007, stated that the lack of appropriate alternative text for images on website remained a problem for blind users and other users who access the web by non-visual interfaces. For instance, the text "Click Here" is a commonly used for alternative text for an image or a link in most websites, but it conveyed no meaningful message to inform what will happen if the image is clicked. The researcher claimed that valuable alternative text is usually composed of words and phrases that can be independently verified to be meaningful. However, the context surrounding and user's personal interpretation were also involved in judging the quality of these alternate texts (Bigham, 2007)

Writing an effective alternate text for images is important and web designer should be well-educated to implement it properly. It was commonly found that web designer decided to assign an alternate text based on the file name of the

image. While occasionally this can be an acceptable strategy but sometimes results in meaningless alternative text. The appropriate way to describe an image should start with understanding the purpose of each image before assigning an alternate text. Some images are meant to use as a decorative component such as bullet or pattern in a background, in this case, the alternate text should be assigned as null alternate text to let the screen reader skip over without pronouncing anything (Moss, 2006).

CHAPTER III
RESEARCH METHODOLOGY

1. Population and samples

The population was all websites in Thailand's web directory, approximately 10,000 websites were registered during December 2009. The 385 samples were calculated by Taro Yamane's formula at the confidence level of 95% as follow;

$$n = \frac{N}{1 + N(e)^2}$$

Where, n = Sample size
N = Population size
e = The error of sampling

According to the above formula, the sample size was calculated as shown;

n = 10,000 / 1 + 10,000 x $(0.05)^2$
= 385

Samples were selected by using purposive sampling method respectively from popularity ranking. The selected samples represented different kinds of websites divided in 5 categories (top 77 websites from each category), ranging from government websites to entertaining websites that all Internet users, including blind users, frequently visit.

The popularity ranking is based on the number of times that internet users have accessed a site in each day, commonly known as page view ranking. The statistics relating to the website rating in Thailand was provided by Truehits. Truehits keeps track of the browsing activities on most websites and reports the statistics daily and monthly for public use via http://truehits.net.

2. Participants

The latter part of this study included blind users to explore the accessibility problems that could be found in browsing 5 websites. The requirements for recruiting blind users were 5 blind adult computer users, ranging in age and education levels. Participants must be legally blind with no other disabilities and usually used JAWS (Job access with speech), a commonly used screen reader in Thailand, to access information in daily lives. The participants were volunteered among blind persons who have passed the computer training course from the department of academic services for the blind of Ratchasuda College, Mahidol University.

The participants were 5 people, aged 29-38, who had been diagnosed as legally blind. All participants were considered as regular internet users by browsing websites at least 5-6 days per week and used JAWS as their screen reader for output information about the websites. Participants had varying levels of experience using JAWS for browsing the websites. One user had 3 years experience, three users had 4 to 6 years of experience, and one had more than 10 years of experience. Participants reported using the websites to access e-mail (5 of 5), to search for information (5 of 5), to read the news (5 of 5), to download software and digital file (3 of 5) and to study online (2 of 5).

3. Instruments

This study required various instruments for different purposes such as evaluating web accessibility and for data collecting process. Firstly, the web accessibility of sample websites was evaluated by A-prompt software. A-prompt was chosen over Bobby, another well-known evaluation software. The analysis of accessibility in both A-Prompt and Bobby are based on the W3C's WAI Web Content Accessibility Guidelines. The advantage of A-Prompt over Bobby is an additional feature to fix the error immediately which is useful for further development of web accessibility. Therefore, A-prompt was considered as an appropriate evaluation tool for this study.

The data from this process were recorded in spreadsheets, awaited for total calculation later on. The list of research instruments included;

1. Computer with internet connection to run the web accessibility evaluation software called A-prompt version 1.0.6 developed by the University of Toronto.

2. Microsoft excel spreadsheet program for collecting and calculating data.

Another part of the study was a laboratory study with 5 blind users, using single computer with screen reader software to test 5 selected websites. The selected computer was set in the same condition for all participants. The list of research instruments included;

1. Computer with internet connection and screen reader software (JAWS version 10.0 developed by Freedom Scientific Company Limited and Tatip developed by PPA Innovation Company Limited) attached with amplifier. All set in a control conditions at the department of assistive technology at Ratchasuda College, Mahidol University.

2. Stopwatch for setting time limit in web testing set limitation at 20 each website.

3. Data checklist and case report form consisted of 3 parts as follows;

    3.1 Part I general information of participant

    3.2 Part II checklist of web accessibility problems from top ranking website of each category.

    3.3 Part III suggestions for accessible web design for blind users.

4. Procedure

The data collection started by using the selected accessibility evaluation software called A-Prompt to test and validate websites for accessibility conformance.

The status was shown as “Failed” or “Conformed to level A”. The results also showed the accessibility problems that could be found in each website.

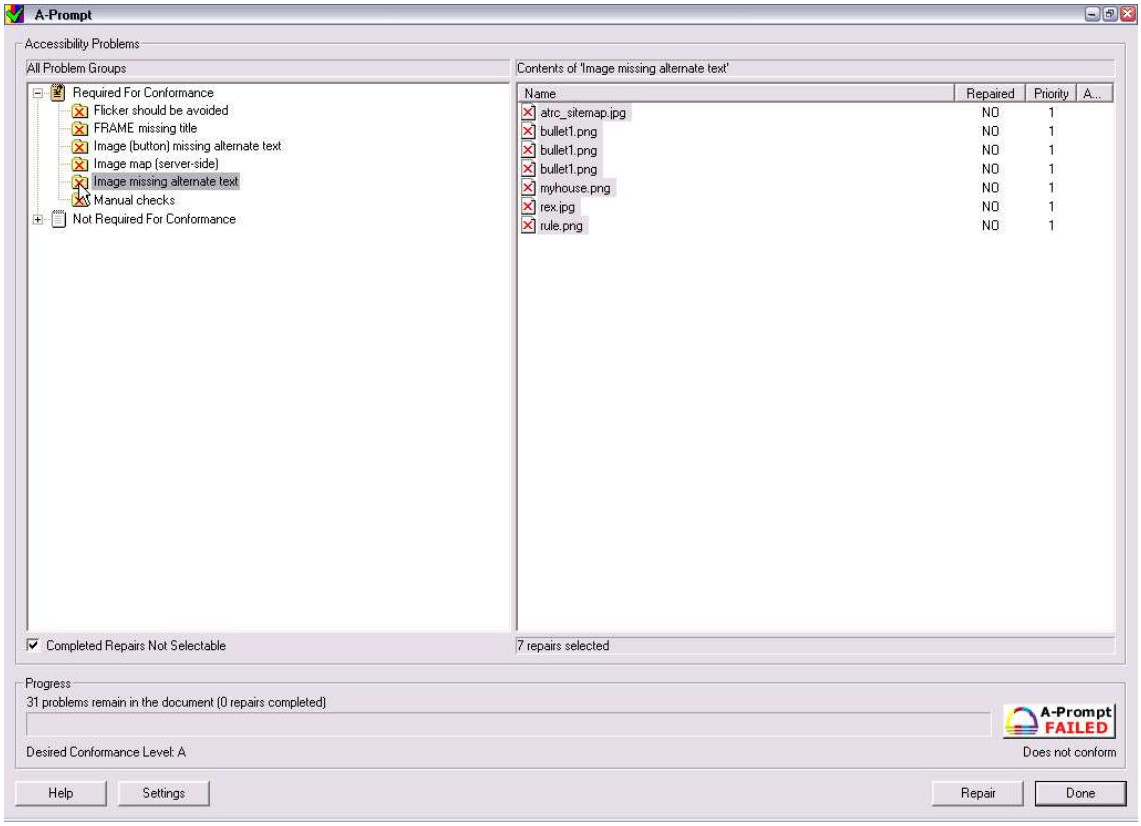

Figure 3.1 Sample of findings from evaluation software

In order to identify web accessibility problems for blind users in this study, several methods of website evaluation process have involved. Although, the findings from evaluation software presented a large number of web accessibility problems, manual checking was still necessary to clarify details that software could not entirely evaluate. For example, the evaluation software could not check spelling of a word which could lead to misunderstanding (shown as “Manual checks” in Figure 3.1). But with manual checking through WCAG, this kind of problem could be found. On the other hand, the evaluation software could not distinguish an image which was used for purely decorative purpose from a meaningful image and could not identify whether the

alternate text provided was appropriate or not (as shown on the right side of Figure 3.1). Therefore, findings from evaluation software and manual checking were different.

The researcher had to manually recheck web accessibility problems that found from evaluation software due to the limitation to judge some subjective problems. The findings from both evaluation methods were reported.

The study commenced upon receiving a permit to perform the research from the Human Research Ethics Committee. The researcher started recruiting the participative volunteers to join the laboratory study. The selection method of candidates was based on the snowball sampling to form the research team of 5 persons as proposed.

The participants were asked to browse 5 websites, the most popular website in each category, ranked by Truehits.net. The web accessibility problems identified by the participants were combined with the observation of the researcher. The duration for the study of each website was 20 minutes with an interval of 5-10 minutes recess prior to accessing the next website in order to provide appropriate pacing and sufficient mind setting for the participants and also to allow the researcher to switch to the new website. Upon completing the study of all 5 websites, the research proceeded to further to analyze the data gathered and finalize the findings as anticipated by the purpose of the study.

5. Scoring system

Evaluation software automatically reported the number of various web accessibility problems in each website. The software system counted each location that found any kind of problem as 1 score. Therefore, same kind of problems was repeatedly counted for quantitative comparison purpose later on.

In the latter part of the study, a laboratory study with blind users was based upon personal preference in browsing only some parts of a website as they usually do

in daily lives. Consequently, the number of web accessibility problems found by blind users was not required for data collection. A checklist and case report form were used to record all problems directly reported aloud by blind users and observed by the researcher.

6. Data analysis

Statistics used for analyzing data of this study were percentage. After gathering numbers of web accessibility problems found by evaluation software from all samples, the results were calculated and presented in the form of text and table format.

In the second part of the study, only selected samples from each category of websites were examined. The number of web accessibility problems found by evaluation software and manual checking were shown.

CHAPTER IV
RESULTS

This chapter presents, analyzes and interprets the data collected in this study. They are divided into 3 parts as follows;

Part I: overall web accessibility

Part II: web accessibility problems found by evaluation software
And web accessibility problems found by manual checking

Part III: web accessibility problems found by laboratory study with 5 blind users

Part I: overall web accessibility

Table 4.1 Number of accessible websites classified by 5 categories of websites

Category of websites	Number of accessible websites	Percentage
1. Government websites	3	0.78
2. Business websites	2	0.52
3. Education websites	1	0.26
4. Entertainment websites	0	0
5. Other websites	1	0.26
Total	**7**	**1.81**

The number of accessible websites in Thailand as a result of this study indicated that 7 websites from 385 websites (1.81%) have passed the evaluation process made by web accessibility evaluation software. Accessible websites were

mostly found in the category of government websites, while none of entertainment websites were considered as an accessible website.

The findings from Table 4.1 showed that 3 government websites from total number of 385 websites (0.78%) were accessible. While in the category of business websites, there were 2 websites from 385 websites (0.52%) that passed the evaluation process. The same quantity of accessible website with percentage of 0.26 was found in the category of education websites and other websites.

Table 4.2 Lists of accessible websites showing names with descriptions

Category of websites	**Names of accessible websites**	**Descriptions**
1. Government websites	www.sso.go.th	Social security office website
	www.tddf.or.th	Thai disabled development foundation website
	www.pwa.co.th	Provincial waterworks authority website
2. Business websites	www.decha.com	Decha and IBS lawyer company website
	www.pbair.com	PB Air company website
3. Education websites	www.thaiall.com	Personal website
4. Entertainment websites	-	-
5. Other websites	www.haarai.com	Web directory websites

Accessible websites in each category were shown to present different ways of handling information in a website. Each website contained various kinds of web contents, such as text, images and forms (details can be seen in Figure 4.1, 4.2, 4.3 and 4.4).

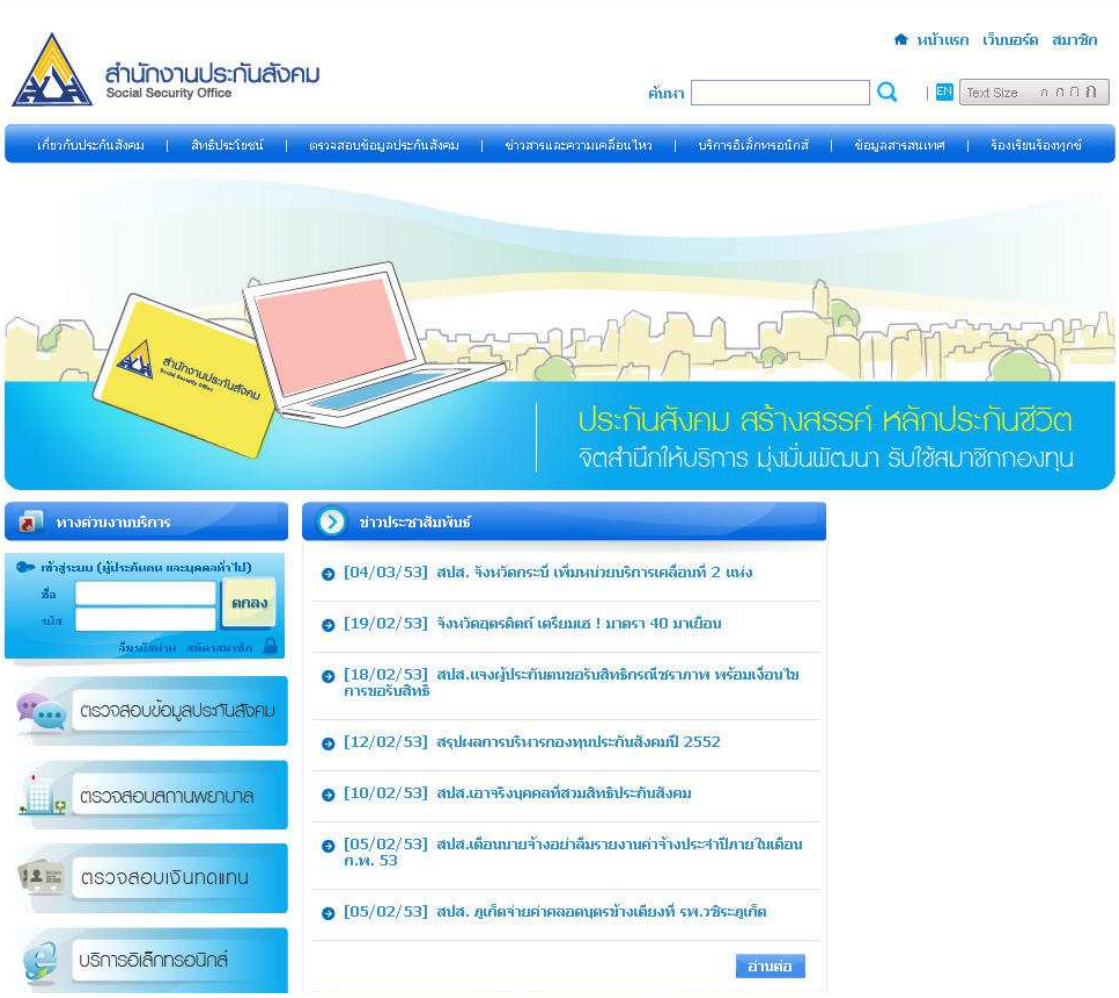

Figure 4.1 www.sso.go.th (Social security office website)

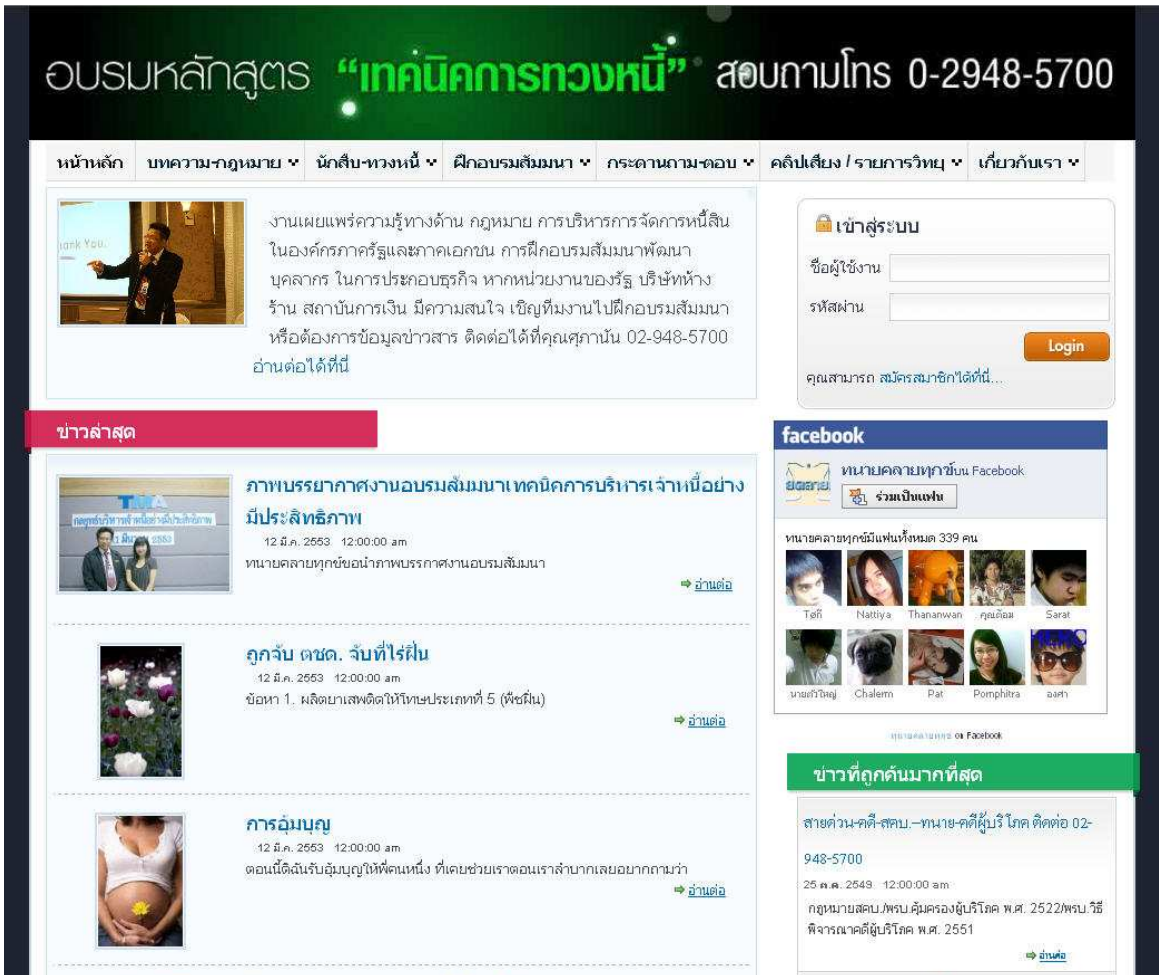

Figure 4.2 www.decha.com (Decha and IBS lawyer company website)

Figure 4.3 www.thaiall.com (Personal website)

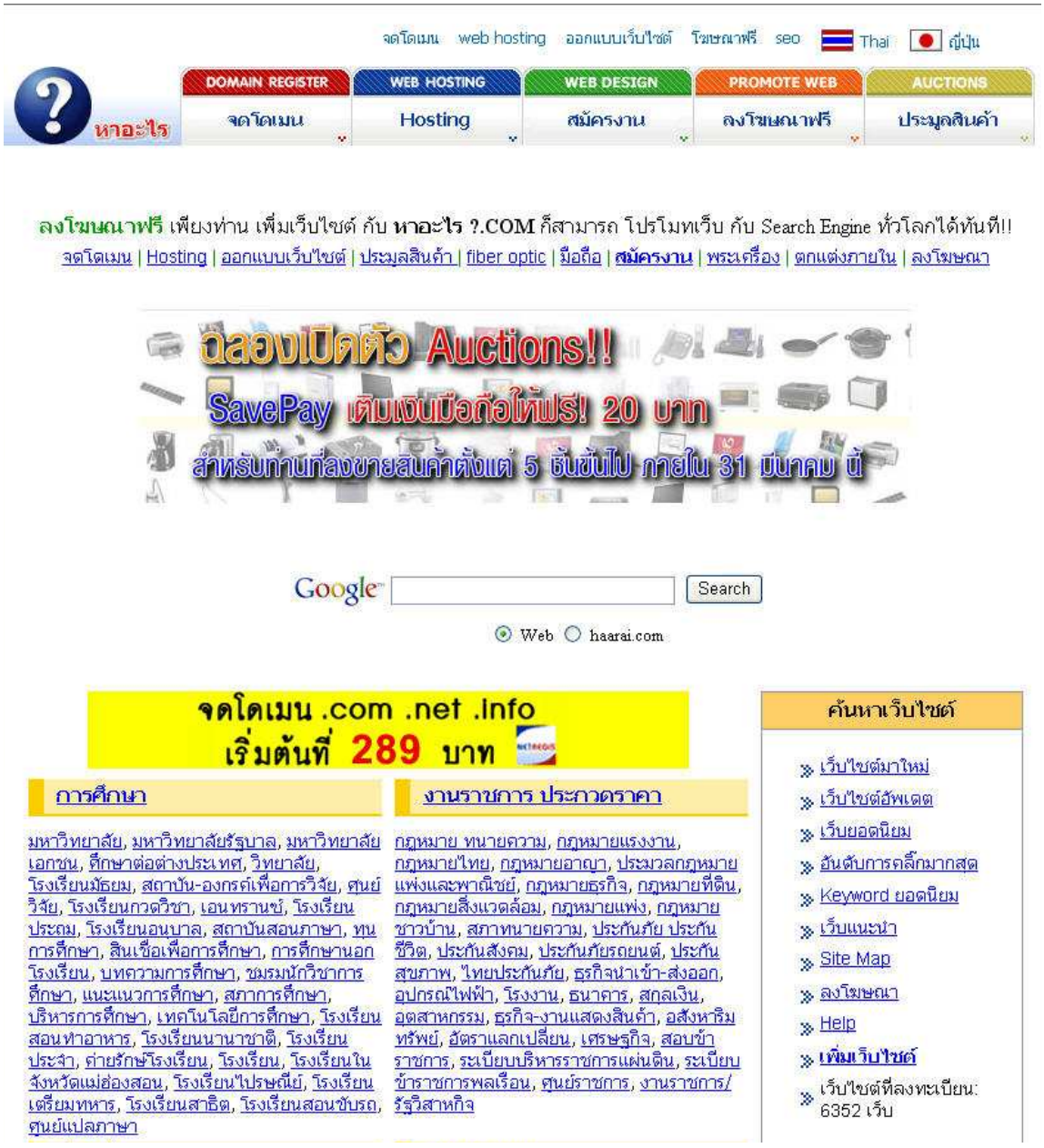

Figure 4.4 www.haarai.com (Web directory websites)

Part II: web accessibility problems found by evaluation software and web accessibility problems found by manual checking

Table 4.3 Number of web accessibility problems classified by 5 categories of websites

Category of websites	Number of web accessibility problems	Percentage
1. Government websites	6,179	18.22
2. Business websites	7,609	22.43
3. Education websites	6,558	19.34
4. Entertainment websites	9,063	26.72
5. Other websites	4,508	13.29
Total	**33,917**	**100.00**

The findings showed that most of web accessibility problems were found in entertainment websites with 9,063 problems from the total number of 33,917 problems (26.72%), while category of business websites and education websites 7,609 and 6,558 problems respectively (details as in Table 4.3).

Table 4.4 Types of web accessibility problems identified by evaluation software

Types of web accessibility problems	Number of web accessibility problems	Percentage
1. Image missing alternate text	24,995	73.69
2. Link missing alternate text	7,006	20.66
3. Form label missing	1,383	4.08
4. Server-side image map	222	0.65
5. Button missing alternate text	126	0.37
6. Marquee (a special effect of text moving)	101	0.30

Table 4.4 Types of web accessibility problems identified by evaluation software (cont.)

Types of web accessibility problems	**Number of web accessibility problems**	**Percentage**
7. Empty heading table	58	0.17
8. Frame missing title	14	0.04
9. Blinking content	8	0.02
10. Broken skip navigation link	4	0.01
11. Irrelevant image description	0	0
12. Irrelevant heading table	0	0
13. Difficult & misspelling word	0	0
Total	**33,917**	**100.00**

The types of web accessibility problems mostly found in this study were the problem of images missing alternate text with percentage of 73.69. The minors were problem of links missing alternate text with percentage of 20.66 and problem of form label missing with percentage of 4.08. In addition to the missing alternate text of displayed images, there were also other kinds of problems found in the evaluation process; such as the use of server-side image map which should be replaced with client-side image map, button missing alternate text, marquee (a special effect of text moving to get more attention from internet user), empty heading table or heading that was not relevant with table content, page title is not informative, blinking content and broken skip navigation link.

Table 4.5 Web accessibility problems found in www.glo.or.th by using evaluation software and manual checking through WCAG

Using evaluation software		**Manual checking through WCAG**	
Type of problems	**Number of problems**	**Type of problems**	**Number of problems**
1. Image missing alternate text	65	1. Image missing alternate text	53
2. Link missing alternate text	4	2. Link missing alternate text	4
3. Form label missing	3	3. Form label missing	3
4. Marquee	1	4. Marquee	1
Total	**73**	**Total**	**61**

The number of accessibility problems found by using evaluation software and problems found by manual checking through WCAG were shown in Table 4.5. Manual checking reported only 53 problems of image missing alternate text while evaluation software reported 65 problems. The images that were used for decoration purpose (see Figure 4.5) were not included in manual check.

Figure 4.5 The sample of an image used in www.glo.or.th for decoration purpose

Table 4.6 Web accessibility problems found in www.siamhrm.com by using evaluation software and manual checking through WCAG

Using evaluation software		**Manual checking through WCAG**	
Type of problems	**Number of problems**	**Type of problems**	**Number of problems**
1. Image missing alternate text	604	1. Image missing alternate text	600
2. Form label missing	31	2. Form label missing	31
3. Link missing alternate text	27	3. Link missing alternate text	27
		4. Misspelling word	3
Total	**662**	**Total**	**661**

The findings in Table 4.6 presented a large number of web accessibility problems found in www.siamhrm.com, especially the problems of image missing alternate text. Manual checking found 600 problems of image missing alternate text, while evaluation software found 604 problems. However, manual checking also identified another type of problems of misspelling word which cannot be found by using evaluation software as shown in Figure 4.6.

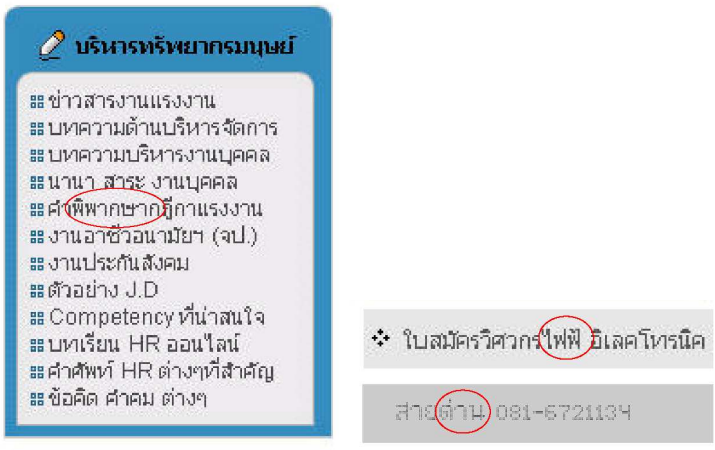

Figure 4.6 The sample of misspelling words found in www.siamhrm.com

Table 4.7 Web accessibility problems found in www.eduzones.com by using evaluation software and manual checking through WCAG

Using evaluation software		**Manual checking through WCAG**	
Type of problems	**Number of problems**	**Type of problems**	**Number of problems**
1. Image missing alternate text	8	1. Image missing alternate text	8
2. Link missing alternate text	2	2. Link missing alternate text	2
3. Form label missing	2	3. Form label missing	2
Total	**12**	**Total**	**12**

The findings from Table 4.7 reported a small number of problems, comparing to top websites from other categories. However, there is no difference between web accessibility problems found by both evaluation methods.

Table 4.8 Web accessibility problems found in www.sanook.com by using evaluation software and manual checking through WCAG

Using evaluation software		**Manual checking through WCAG**	
Type of problems	**Number of problems**	**Type of problems**	**Number of problems**
1. Form label missing	16	1. Form label missing	16
2. Link missing alternate text	6	2. Misspelling word	15
		3. Link missing alternate text	6
Total	**22**	**Total**	**37**

The findings from Table 4.8 presented a difference between problems found by both evaluation methods. As a result of limited spell check capability of

evaluation software, misspelling words are evident in www.sanook.com by manual checking.

In the same manner as most entertainment websites that need rapidly changed update news and articles hour by hour, www.sanook.com had made 15 mistakes on misspelling words as shown in Figure 4.7.

Figure 4.7 The sample of misspelling word found in www.sanook.com

Table 4.9 Web accessibility problems found in www.212cafe.com by using evaluation software and manual checking through WCAG

Using evaluation software		**Manual checking through WCAG**	
Type of problems	**Number of problems**	**Type of problems**	**Number of problems**
1. Image missing alternate text	80	1. Image missing alternate text	80
2. Link missing alternate text	13	2. Link missing alternate text	13
3. Form label missing	3	3. Form label missing	3
4. Marquee	1		
Total	**97**	**Total**	**96**

Most findings from both evaluation methods are similar, except the fact that evaluation software reported 1 problem of using marquee in www.212.cafe. A marquee is a scrolling piece of text displayed either horizontally across or vertically down a website page depending on the settings. However, after checking through the web manually, it was found that the text that appear as marquee were also provided in accessible format below as shown in Figure 4.8.

Figure 4.8 The sample of marquee found in www.212cafe.com

Part III: web accessibility problems found by laboratory study with 5 blind users

Overall, the participants had positive comments for www.glo.or.th, the government lottery office website. All participants reported that they found images without alternate text in this website. The exact number of problem was unknown due to personal browsing habits. Although evaluation software claimed that there were forms without label in this website**,** but most participants (4 of 5) successfully completed the forms to check the winning lottery numbers. Links missing alternate

text were also found by 3 participants, corresponding to the findings from evaluation software (see Figure 4.9).

Figure 4.9 www.glo.or.th (government lottery office website)

On the contrary, www.siamhrm.com – a human resource and jobs community website was ranked by blind users to be the most inaccessible website among all selected websites. According to the findings from evaluation software, over 600 problems were found in this website. All participants encountered a large number of images missing alternate text and links missing alternate text. Additionally, misspelling words were also pronounced during the test. An ability to guess the meaning of misspelling words were upon individual interpretation from the context of

each word. For example, the word “สายด่วน” (or hotline in Thai) appeared as “สายด่าน” could be understood by listening to the phone number at the end of that sentence (see Figure 4.10).

Figure 4.10 www.siamhrm.com (human resource and jobs community website)

For www.eduzones.com, all participants admired the preparation of alternate text for most images in this website. Each image or icon provided a suitable description for blind users. However, the majority of participants (4 of 5) reported that the structure of web contents was presented by tables with 2 to 3 columns without priority order, resulted in time-consuming process to explore all subjects. The browsing patterns of each participant were observed; one participant try to find list of main menu first then use shortcut key insert+F7 to search for interesting topic, one participant use shortcut key L to estimate the length of each subject such as “list of 9”

then skipped to the next subject, while the rest of participants (3 of 5) used “tab” or “down arrow” to listen to every subject one by one (see Figure 4.11 and 4.12).

Figure 4.11 www.eduzones.com (I-education zone company website)

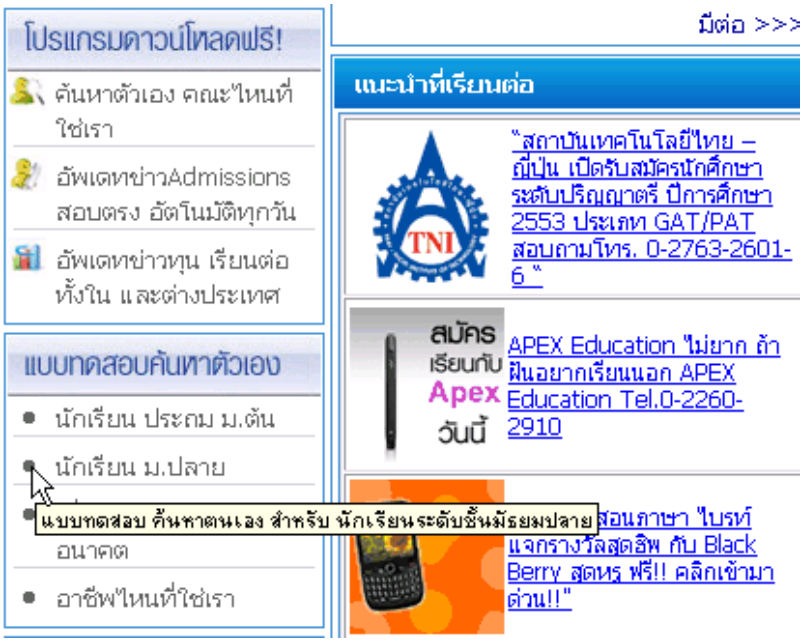

Figure 4.12 The sample of image with alternate text in www.eduzones.com

The problem of image missing alternate text was expected to be the majority of web accessibility problems that could be found in entertainment websites. Surprisingly, www.sanook.com had prepared descriptions for all images and still be able to use a large number of graphics components as needed. Interesting findings in word spelling problems were also noticed. Two participants found particular problems that could not be found by evaluation software or manual checking. For example in Figure 4.13, the use of "…" in article name "ดูนางให้ดู...เท้า" were pronounced as "ดู-นาง-ให้-ดู-ด็อท-ด็อท-ด็อท-เท้า" as a result of language switching mode.

Figure 4.13 The sample of problem found in www.sanook.com

This kind of problem might not be considered as a severe problem but it could cause annoyance for blind users. Another sample was also the effect of mistake in typing content by web developer as shown in Figure 4.14. The word "น้ำมัน" was typed incorrectly by using punctuation in place of vowel, by doing so, it was pronounced as "นอ-หนู-จุด-บน-ไม้-โท-สระ-อา-มัน" instead of "น้ำ-มัน".

Figure 4.14 The sample of problem found in www.sanook.com

The similar problem was also found in www.212cafe.com. Web contents were provided by a list of subjects and also prepared a small icon at the end the list to click for further information. In Figure 4.15 "[+]" icon was shown as a link to another page of the website. The problem occurred when blind users cannot interpret the meaning of this icon and the screen reader pronounced it as "วง-เล็บ-ก้าม-ปู-เปิด-พลัส-วง-เล็บ-ก้าม-ปู-ปิด".

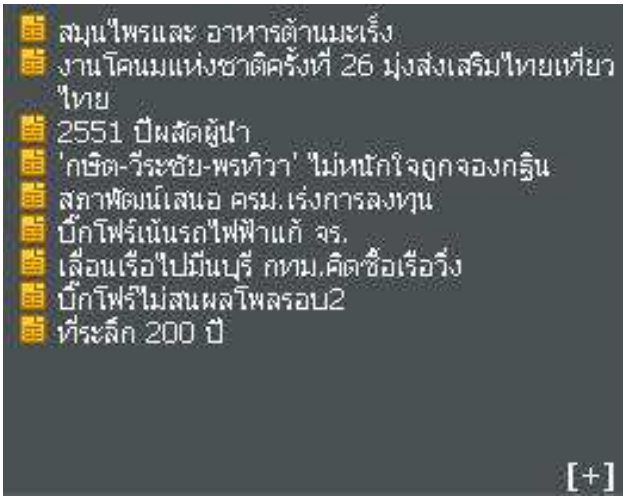

Figure 4.15 www.212cafe.com (freedom online community website)

In conclusion, blind users mostly reported the same web accessibility problems as found by evaluation software and manual checking. However, some unique problems such as the use of symbol or the change between English and Thai language which required self-interpretation were also found due to different personal experiences of blind users.

CHAPTER V
DISCUSSION, CONCLUSION AND RECOMMENDATIONS

DISCUSSION

The findings from the study of accessible website for blind users in Thailand combined with quantitative and qualitative results. The discussion was divided into 3 parts as follows;

Part I: a number of accessible websites in Thailand

Part II: web accessibility problems found by evaluation software and web accessibility problems found by manual checking

Part III: web accessibility problems found by laboratory study with 5 blind users

Part I: a number of accessible websites in Thailand

The findings indicated that 1.81% of websites in Thailand are accessible (see Table 4.1). The numbers of accessible websites in each category are varied. In the category of government websites, 3 websites from 77 websites were assessed as accessible. The previous study on accessibility of government websites in Thailand by Mitsamarn, Gestubtim and Junnatas (2007) reported that only 1% of government websites were accessible, while another study on accessibility of government websites in Taiwan reported that 28 websites from 35 websites were accessible. (Chen and Shao, 2005)

Looking further at the findings from other categories, business websites also gave priority to web accessibility issue as government websites and became the first runner-up category with 2 accessible websites. The category of education websites and other websites reported the same level of accessibility by found only 1 accessible website. The study also revealed that despite a move towards the design of

accessible websites, none of entertainment websites were able to comply with the Web Content Accessibility Guidelines (WCAG).

Although all entertainment websites failed to be considered as accessible, some websites from this category presented a good example of web design with full use of graphics elements. For instance, www.sanook.com – the most popular websites, found only 22 errors in total and provided alternate text to most of images used in the website. The result was concordant with the findings from a study entitled "Tension, what tension?: Website accessibility and visual design". Petrie, Hamilton and King (2004) tried to elaborate the belief among web designers that beautiful and interesting website cannot be accessible by conducting the accessibility testing with various kinds of websites such as government, business and entertainment websites (Petrie, Hamilton and King, 2004).

Considering the nature of accessible websites found in this study, two in three of accessible government websites were from the organizations that directly served people with disabilities, namely; website of social security office and Thai disabled development foundation. While accessible business websites were owned by Decha and IBS (a lawyer company) and PB Air (an airline company). Unfortunately, PB Air Company was officially closed down due to financial crisis at the end of year 2009. Two accessible websites, both from education websites category and the other websites category, were text-oriented and could almost be considered as text-only websites.

Part II: web accessibility problems for blind users that can be found by using a web accessibility evaluation software and manual checking through the Web Content Accessibility Guidelines (WCAG)

In exploring various kinds of web accessibility problems found by different evaluation techniques, the evaluation software performed well for its purpose of indicated as many problems as possible in a short period of time. In Table 4.3, the total number of web accessibility problems found from all websites was 33,917 problems. The problem of image missing alternate text were identified as a major problem above all which is conformed to the findings from the study of Asakawa

(2005) that image without alternate text was the biggest problem for users who use screen reader to access website. However, it was limited in terms of accuracy to evaluate the subjective issues such as the suitability of alternate text for images. Therefore, human judgment is required to cross-check the problems found by evaluation software.

A-prompt, the selected evaluation software in this study, provided a feature of “Manual check” warning reported concurrently with the lists of accessibility problems found. The findings from manual checking identified fewer problems than evaluation software in Table 4.5. Some images presented in www.glo.or.th are for decoration. They do not intend to convey any meaningful information. In this case, an alternate text of a decorating image should be left empty or assign as null alternate text. By doing so, screen reader software will completely ignore the image and will not announce its presence (see Figure 4.5).

Although, the appropriate way to assign an alternate text for an image is rely on web designer’s decision to present visual information in text form. But in some cases, image was used as link to other part of the website and required more considerations to choose a suitable description to explain its function as well. For example, the website that used an image of a house as a link back to the first page might need to present an informative description to let the Internet user know more than just a name of such image. Rather than assigning an alternate text as “a house”, the image should be described as “link to homepage” instead. Accordingly, a manual check through WCAG could be able to fill the gap of vague communication. (Bigham, 2007).

The difference between personal perceptions and interpretations of blind users played an important role in considering an alternate text as appropriate or not. The suggestion was in conformity with Neilsen and Pernice’s study in 2001 that the quality assessment of alternate text is needed for further investigation (Neilsen and Pernice, 2001). Moreover, new technologies were involved in designing an accessible websites. Web authoring software such as Adobe Dreamweaver CS4 has recently added new feature that prompt the web designer to enter an alternate text for every

image used. As a result, web designer will need to pay more attention before assigning each alternate text.

Manual checking also identified other types of problems which cannot be found by using evaluation software solely. Misspelling was found in www.siamhrm.com as shown in Table 4.6 and also found in www.sanook.com as shown in Table 4.8. Consequently, further improvement of misspelling word evaluation should be conducted, especially for websites that need rapid change of information such as online news and articles. Mistakes possibly happen during web updating process, but new technologies are becoming more efficient to detect the problems before publicizing the information. Meanwhile, blind users' ability to guess the meaning of misspelling word is varied by different level of experiences.

Part III: web accessibility problems for blind users that can be found by laboratory study with 5 blind users

For evaluation by blind users, web accessibility problems were identified without counting number of problems found. Despite the fact that some web accessibility problems were reported in www.glo.or.th from other evaluation methods, most participants successfully browsed through articles and filled up a form to check the winning lottery number proficiently. Familiarity was involved in this case according to prior experiences of all participants who had visited this website before.

The findings from assessing www.siamhrm.com and www.eduzones.com were corresponding with the results from evaluation software and manual checking. The problems of image missing alternate text were reported as the highest problems found in www.siamhrm.com (see Table 4.6) and were also considered as the most difficult web to browse by all participants. While the findings from Table 4.7 showed that www.eduzones.com had the smallest number of web accessibility problems, all participants agreed that the images used in this web were well-prepared.

However, in www.sanook.com and www.212cafe.com, 2 participants claimed that they confronted with difficulties in guessing the meaning of words pronounced by screen reader (see samples shown in Figure 4.13, 4.14 and 4.15). These

problems were unable to detect by evaluation software and manual checking. The findings from this study became another evidence to support the necessity of laboratory study with blind users in evaluating an accessible website, or at least attempt to operate an evaluation method which can provide the proximal result as testing with blind user. Testing web by using screen reader with monitor turned off was suggested in a comparative study of methods for assessing web accessibility for blind users which conducted by Mankoff, Fait and Tran in 2005 and mentioned once again in Rosmaita's study (2006).

CONCLUSION

The study of accessible websites for blind users in Thailand aimed to survey the total number of accessible websites for blind users in Thailand and also explore various kinds of web accessibility problems found by different evaluation methods. The samples were 385 popular websites from 5 categories, ranked and classified by Thailand web directory and web statistics from Truehits.net in December 2009. All samples were assessed by evaluation software named A-prompt prior to a manual checking through WCAG. Eventually, the laboratory study with 5 blind users was conducted to acquire in-depth information from experienced screen reader users.

Overall, the results showed that 7 websites from 5 categories with the total number of 385 websites were accessible (1.81%). In the category of government websites, there were 3 accessible websites, namely; www.sso.go.th (Social security office website), www.tddf.or.th (Thai disabled development foundation website) and www.pwa.or.th (Provincial waterworks authority website). In the category of business websites, there were 2 accessible websites, namely; www.decha.com (Decha and IBS lawyer company website) and www.pbair.com (PB Air company website). In the category of education websites and the category of other websites, www.thaiall.com (Personal website) and www.haarai.com (Web directory website) were evaluated as accessible websites.

Various types of web accessibility problems were identified by evaluation software. The problem mostly found in this study was image missing alternate text, with the highest number of 24,995 problems from 33,917 problems (73.69%) reported, followed by link missing alternate text (20.66%) and form label missing (4.08%) respectively. Moreover, evaluation software also reported other types of web accessibility problems such as server-side image map, button missing alternate text, marquee, empty heading table, frame missing title, blinking content and broken skip navigation link.

Afterwards, web accessibility problems found from manual checking were slightly different from evaluation software. The problems of image missing alternate text were examined and some images were distinguished as decorative images. As a result of manual checking, the findings of government website and business website reported less number of images missing alternate text. Conversely, the problems of misspelling word which cannot be identified by evaluation software were reported by manual checking of business website and entertainment website.

For laboratory study with 5 blind users, the participants reported that the problems of images missing alternate text were found in most websites which is corresponding to the findings from evaluation software and manual checking. However, most of images in www.eduzones.com and www.sanook.com provided useful alternate texts that helped blind users to understand visual information as sighted users. Although, the exact number of problem could not be identified by blind users due to different browsing habits. But the advantage of this evaluation method was the ability to detect unique problems that could only be found by blind users such as improper alteration between English and Thai language.

Summarily, because of the high variation in performance at finding problems among various evaluation methods, the combination of findings from all methods is necessary for better insight in exploring web accessibility problems. No single evaluator or tool could be counted on solely. Web designer or web developers might rely upon lightweight method in the preliminary stage such as automatic evaluation software, which is available online for free. Then gradually gather up expert’s comment and blind user’s opinion to improve the accessibility later on.

RECOMMENDATIONS

From the study, there are suggestions as follows;

1. Recommendations for accessible web designing from blind users.

Although WCAG suggested that web designers might provide an option to create a text-only version of website for accessibility reason. Blind users in this study claimed that they prefer to access the same interface as other users, rather than browsing a separate text-only version of websites.

Another recommendation for designing an accessible website for blind users is consistency of page format. Many websites are difficult to interact with due to the complexity of the presented information. Browsing each page of websites can be thought of as a traveling route for blind users. Although, some websites provide a sitemap as a guide for understanding the structure of the websites, blind users claimed that they prefer to read through the pages or navigate by headings or subjects. Therefore, blind users expected that format of layout should be the same in every pages.

Moreover, it was also suggested that instead of ranking websites by popularity as appeared in Truehits.net website, there should be a list of websites ranked by accessibility likewise. Consequently, blind users will be able to use websites without vainly go through the trial and error process time and again.

2. Recommendations for further study on web accessibility issue.

Blind users are Internet's users who have to confront with web accessibility problems directly. Hence, web designing process should not be operated without perspectives and comments from blind users. Although, Neilson and Landauer (2000) suggested that minimal number of 5 participants can be considered as an effective and affordable user testing. A laboratory study with larger group of blind users should be conducted in the future for further investigation. According to the difference of experiences and browsing habits of each blind user, the ways of handling with web accessibility problems might be dissimilar. Besides, the scope of study under

the subject of web accessibility should extend to a wider range of Internet user with other disabilities because each group of the disabled users has to cope with specific concerns and constraints.

In addition, the number and design of websites in Thailand keep changing all the time. Therefore, Thailand's web accessibility evaluation should be observed regularly. In the same way as Asakawa (2005) managed to study the difference of web accessibility problems found during year 1997 to 2005. The findings can imply the potential of web accessibility situation in the future.

Furthermore, there is a growing number of web accessibility evaluation software varying in features and advantages of finding web accessibility problems. Aside from A-prompt used in the present study, other evaluation software such as Bobby or Lift should be compared for their performance and effectiveness. As a result, web designers can choose the appropriate tool for evaluating their web accessibility.

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APPENDICES

APPENDIX A

Most popular websites in Thailand (December 2009)

TOP 1 - 500 Website หมวด หน่วยงานราชการ,องค์กร ประจำเดือน ธันวาคม 2009							
ที่	ชื่อเว็บไซต์ (เรียงตาม Unique IP,Session,Pageview เฉลี่ยรายวัน)	Unique IP	Unique Session	Pageview			
1	www.glo.or.th	44,600	68,274	267,610	▲9.48 %		
2	www.obec.go.th	15,756	28,164	56,138	▼9.01 %		
3	www.thaitambon.com	10,717	14,555	68,122	▼2.85 %		
4	www.bot.or.th	9,729	16,670	44,950	▼4.86 %		
5	www.thailocaladmin.go.th	8,198	18,715	21,153	▼16.36 %		
6	www.cm108.com	8,054	11,897	41,866	▼23.06 %		
7	www.prd.go.th	7,761	13,094	29,869	▲12.66 %		
8	www.ocsc.go.th	7,612	12,992	48,872	▲11.50 %		
9	www.rd.go.th	7,329	12,219	22,287	▼6.01 %		
10	www.thailandpost.com	6,416	13,568	32,633	▲3.15 %		
11	www.tpa.or.th	5,068	6,077	11,794	▼14.97 %		
12	www.sso.go.th	3,885	7,496	8,443	▼0.56 %		
13	www.mfa.go.th	3,506	7,190	14,846	▼12.83 %		
14	www.studentloan.or.th	3,170	4,777	11,292	▼36.69 %		
15	www.ismed.or.th	3,010	4,025	4,900	▼11.83 %		
16	www.dopa.go.th	2,952	5,785	5,925	▼24.13 %		
17	www.trf.or.th	2,852	4,049	15,226	▼16.34 %		
18	www.rtaf.mi.th	2,591	6,682	10,209	▲30.73 %		
19	www.consumerthai.org	2,485	3,512	16,467	▼11.75 %		
20	www.sme.go.th	2,434	3,078	6,972	▼12.45 %		
21	www.mwa.co.th	2,344	3,307	10,109	▲183.09 %		
22	www.whitemedia.org	2,301	3,005	9,685	▼18 %		
23	www.phtnet.org	2,241	3,248	4,680	▼15.82 %		
24	www.dld.go.th	2,006	5,870	7,035	▼20.43 %		
25	www.nicaonline.com	1,976	2,413	4,499	▲55.10 %		
26	www.stkc.go.th	1,967	3,096	4,849	▼25.8 %		
27	www.royin.go.th	1,940	2,506	5,911	▼16.74 %		

28	www.tistr.or.th	1,882	2,818	5,420	10.04 %	
29	www.moe.go.th	1,862	2,485	6,313	7.5 %	
30	www.dbd.go.th	1,825	7,237	40,367	4.95 %	
31	www.culture.go.th	1,722	2,311	10,665	25.2 %	
32	www.rakbankerd.com	1,465	1,890	3,908	11.75 %	
33	www.eppo.go.th	1,438	2,081	3,559	3.01 %	
34	www.doae.go.th	1,418	3,797	6,144	15.75 %	
35	www.consular.go.th	1,352	2,607	5,930	8.09 %	
36	www.mof.go.th	1,351	3,846	13,494	2.97 %	
37	www.clinictech.most.go.th	1,313	1,517	2,412	14.13 %	
38	www.rubberthai.com	1,254	1,806	4,922	13.48 %	
39	www.sec.or.th	1,244	2,451	8,627	21.56 %	
40	www.mdh.obec.go.th	1,223	2,952	5,372	13.81 %	
41	www.tddf.or.th	1,189	1,879	4,553	9.99 %	
42	palaces.thai.net	1,176	2,201	8,916	284.31 %	
43	kanchanapisek.or.th	1,130	2,027	15,684	73.05 %	
44	www.tisi.go.th	1,123	1,669	4,398	12.4 %	
45	www.fda.moph.go.th	1,103	1,719	4,070	17.99 %	
46	www.depthai.go.th/	1,091	2,142	4,984	18.4 %	
47	www.moc.go.th	1,088	3,310	4,789	16.31 %	
48	www.thaigov.go.th	1,070	2,122	3,302	4.49 %	
49	www.rta.mi.th	1,045	1,629	2,135	28.77 %	
50	www.moac.go.th	1,032	1,924	6,086	8.99 %	
51	www.pcd.go.th	1,030	1,574	3,901	7.46 %	
52	www.dede.go.th	1,026	1,541	2,901	12.53 %	
53	www.nstda.or.th	1,015	1,697	4,328	29.46 %	
54	www.onesqa.or.th	1,014	1,439	3,892	35.37 %	
55	www.rid.go.th	996	3,071	3,339	287.55 %	
56	www.krisdika.go.th	941	1,826	7,213	45.67 %	
57	www.tistr-foodprocess.net	928	1,226	1,503	12.86 %	
58	www.nso.go.th	927	1,387	5,102	28.31 %	
59	www.mohanamai.com	913	1,306	4,217	9.15 %	
60	www.pwa.co.th	911	4,286	5,142	15.18 %	
61	www.transport.co.th	905	1,526	1,962	54.17 %	
62	www.dld.go.th/ict/	888	2,233	2,700	2.31 %	
63	www.energy.go.th	884	2,080	3,453	26.15 %	
64	www.ipthailand.org	875	1,810	4,396	11.62 %	
65	www.moi.go.th	875	1,277	3,145	23.65 %	
66	www.most.go.th	866	1,174	2,770	29.59 %	

67	siweb.dss.go.th	852	1,150	2,818	20.96 %	
68	www.exim.go.th	843	1,128	2,292	10.03 %	
69	www.pea.co.th	829	1,109	2,212	10.96 %	
70	www.thaitradefair.com	803	952	3,039	8.65 %	
71	www.labour.go.th	784	1,714	4,003	13.13 %	
72	www.codi.or.th	784	1,123	1,698	21.29 %	
73	www.moj.go.th	743	1,361	2,300	10.8 %	
74	www.mot.go.th	728	1,640	4,490	3.06 %	
75	www.oic.or.th	688	1,417	6,626	12.58 %	
76	speedtest.nectec.or.th	685	820	1,218	7.03 %	
77	www.bnc.co.th	678	1,802	2,077	5.44 %	

TOP 1 - 500 Website หมวด ธุรกิจ ประจำเดือน ธันวาคม 2009						
ที่	ชื่อเว็บไซต์ (เรียงตาม Unique IP,Session,Pageview เฉลี่ยรายวัน)	Unique IP	Unique Session	Pageview		
1	www.siamhrm.com	56,180	77,265	143,390	0.18 %	
2	www.yellowpages.co.th	35,085	49,710	151,151	13.21 %	
3	www.jobbkk.com	27,834	50,148	742,345	8.27 %	
4	www.jobth.com	26,020	41,378	334,262	13.02 %	
5	www.jobsdb.com/TH	23,801	39,946	268,757	4.83 %	
6	www.dtac.co.th	21,520	32,296	100,272	25.01 %	
7	www.jobthai.com	21,433	40,192	526,871	14.18 %	
8	www.3bb.co.th	21,310	27,208	77,408	385.42 %	
9	www.cmprice.com	11,961	19,498	39,158	6.6 %	
10	www.happy.co.th	11,429	15,921	24,243	11.49 %	
11	www.hflight.net	10,216	15,354	50,143	0.71 %	
12	www.jobthaiweb.com	8,635	12,092	70,118	17.41 %	
13	www.truecorp.co.th	8,469	14,310	50,071	25.71 %	
14	www.thaieasyjob.com	8,377	10,299	37,763	11.59 %	
15	www.buddyjob.com	6,909	8,734	37,938	38.19 %	
16	www.tot.co.th	6,132	12,085	28,092	8.70 %	
17	www.nationejobs.com	6,132	8,338	41,336	11.88 %	
18	job.ocsc.go.th	5,965	9,032	34,740	34.01 %	
19	www.jobduzy.com	5,849	6,491	10,714	15.29 %	
20	www.tttonline.net	5,548	10,011	20,418	13.69 %	
21	www.jobsiam.com	5,318	6,085	13,026	16.41 %	
22	www.plazajob.com	5,107	5,977	14,878	17.22 %	
23	www.joburl.com	4,944	5,890	12,888	16.26 %	

24	www.nalueng.com	4,677	5,328	12,020	▼23.91 %	
25	www.classifiedthai.com	4,261	4,838	11,289	▼19.44 %	
26	www.ezyjob.com	3,538	4,394	14,725	▼18.12 %	
27	www.thaicabincrew.com	2,787	4,268	21,433	▲6.54 %	
28	www.thaifranchisecenter.com	2,770	5,295	17,432	▼1.56 %	
29	www.siamjobonline.com	2,614	2,955	6,952	▼31.7 %	
30	www.decha.com	2,507	2,988	5,570	▼4.57 %	
31	www.agel-center.com	2,392	2,646	3,969	▲0.04 %	
32	www.bts.co.th	2,389	2,905	9,063	▼2.41 %	
33	www.500job.com	2,294	2,736	8,896	▼2.3 %	
34	www.jobnorththailand.com	2,282	6,846	39,265	▼1.13 %	
35	phonebook.tot.co.th	2,234	9,193	40,272	▼10.17 %	
36	www.emthai.com	2,084	2,661	3,398	▼11.58 %	
37	www.jobjob.co.th	1,994	2,209	3,288	▼15 %	
38	hamsiam.com	1,896	4,298	41,099	▲7.48 %	
39	www.icafeplus.net	1,887	2,885	15,450	▲7.58 %	
40	marketingoops.com	1,846	2,229	3,841	▲9.23 %	
41	www.appjob.com	1,676	2,258	2,314	▼12.84 %	
42	www.thaiadpoint.com	1,597	3,249	4,429	▼15.19 %	
43	www.roytawan.com	1,526	3,070	8,187	▼11.84 %	
44	www.thailand.com	1,448	1,705	4,837	▼12.4 %	
45	www.friend.co.th	1,421	2,046	2,451	▼47.55 %	
46	www.jobant.com	1,343	2,298	8,682	▼31.97 %	
47	www.cattelecom.com	1,340	2,648	8,943	▼16.25 %	
48	www.jobtou.com	1,322	1,458	2,631	▼12.8 %	
49	www.nanosoft.co.th	1,289	2,557	4,184	▼4.8 %	
50	www.Omoneycenter.com	1,254	1,544	5,517	▼8.67 %	
51	www.jobbyyou.com	1,123	2,078	6,746	▼23.08 %	
52	www.thailandexhibition.com	1,123	1,242	2,168	▼11.57 %	
53	www.jobdue.com	1,105	1,200	1,933	▼16.67 %	
54	www.thaijobpost.com	1,089	1,610	3,127	▼12.39 %	
55	www.mjob.in.th	1,077	1,388	1,516	▼29.42 %	
56	www.dtvthai.com	974	1,198	4,661	▲15.40 %	
57	www.paysbuy.com	973	1,410	8,198	▼4.33 %	
58	www.jobbees.com	957	1,182	6,218	▼12.2 %	
59	www.bangkokmetro.co.th	944	1,168	4,664	▼10.35 %	
60	www.jobbangkok.com	940	1,253	1,358	▼1.47 %	
61	www.commartthailand.com	929	1,033	2,224	▼75.35 %	
62	www.pantavanij.com	921	2,088	25,395	▲5.02 %	
63	www.qsncc.co.th	869	1,011	3,373	▼22.69 %	

64	www.tcdcconnect.com	771	1,035	1,365	▼11.68 %		
65	nukbunchee.com	769	1,031	2,238	▼21.05 %		
66	www.pbair.com	752	1,278	2,632	▼28.65 %		
67	www.bridgestone.co.th	746	928	3,940	▲11.84 %		
68	www.thaifreelancebid.com	736	1,152	2,085	▼17.3 %		
69	www.thaitelephone.com	702	944	4,363	▼9.42 %		
70	www.ee-part.com	702	889	1,205	▼16.82 %		
71	justindy.com/	694	912	1,199	▲4.52 %		
72	www.archeep.com	689	1,301	3,367	▼57.83 %		
73	www.pb-pac.com	671	1,106	2,157	▼7.06 %		
74	www.thaiitjobs.com	659	1,298	4,387	▼15.73 %		
75	www.adecco.co.th	599	768	3,471	▲27.72 %		
76	www.jssr.co.th	569	911	10,597	▼9.11 %		
77	www.mlm.in.th	556	615	1,102	▼17.01 %		

TOP 1 - 500 Website หมวด การศึกษา ประจำเดือน ธันวาคม 2009							
ที่	ชื่อเว็บไซต์ (เรียงตาม Unique IP,Session,Pageview เฉลี่ยรายวัน)	Unique IP	Unique Session	Pageview			
1	www.eduzones.com	75,480	160,002	453,817	▼5.23 %		
2	www.vcharkarn.com	60,660	90,934	293,011	▼13.13 %		
3	gotoknow.org	46,859	67,741	148,392	▼11.48 %		
4	www.thaigoodview.com	38,967	62,437	231,770	▼3.58 %		
5	www.kroobannok.com	30,827	43,643	79,303	▼1.31 %		
6	learners.in.th	18,163	23,862	56,001	▼15.99 %		
7	panyathai.or.th	17,487	28,187	39,170	▼3.75 %		
8	www.ru.ac.th	14,146	20,546	28,343	▼40.99 %		
9	www.mahidol.ac.th	13,462	29,355	106,314	▼3.68 %		
10	www.j-doramanga.com	12,758	16,364	38,105	▲17.44 %		
11	www.rmutphysics.com	12,537	19,036	86,704	▲2.13 %		
12	www.tumcivil.com	11,907	15,993	58,331	▼12.32 %		
13	lexitron.nectec.or.th	11,725	18,755	87,599	▼4.4 %		
14	www.spu.ac.th	10,956	14,670	30,707	▲56.05 %		
15	www.ku.ac.th	9,932	20,309	22,323	▼20.15 %		
16	www.thaiall.com	8,317	13,717	19,665	▼4.33 %		
17	www.icphysics.com	7,543	12,580	37,932	▲5.33 %		
18	www.stou.ac.th	7,413	19,843	31,993	▲40.61 %		
19	www.educatepark.com	7,042	12,756	31,063	▲17.33 %		
20	www.sudipan.net	5,575	7,906	11,777	▲3.51 %		

21	www.sema.go.th	5,288	8,206	13,314	▼15.34 %	
22	www.unigang.com	4,611	6,721	27,064	▲721.93 %	
23	www.siamdic.com	4,317	8,169	16,448	▼12.36 %	
24	www.sahavicha.com	4,004	4,857	11,548	▼22.01 %	
25	www.nidambe11.net	3,664	5,270	6,315	▼21.56 %	
26	www.radompon.com	3,583	4,176	6,306	▼7.3 %	
27	www.utcc.ac.th	3,556	7,268	11,931	▼34.81 %	
28	www.kam.tv	3,468	8,117	32,303	▼18.17 %	
29	www.lib.ru.ac.th	3,226	4,335	12,737	▼20.21 %	
30	www.suanboard.net	3,178	5,577	21,970	▼10 %	
31	www.psu.ac.th	3,143	8,492	20,266	▲3.94 %	
32	www.chemtrack.org	3,101	4,025	7,887	▼8.74 %	
33	www.maipradabonline.com	2,734	4,989	11,415	▼15.8 %	
34	www.metukyang.com	2,669	2,893	20,448	▼8.41 %	
35	bodinzone.com	2,628	3,926	10,260	▼4.99 %	
36	thaiio.com	2,470	4,786	10,956	▼9.12 %	
37	www.nu.ac.th	2,470	4,062	4,906	▲6.28 %	
38	www.dusit.ac.th	2,419	4,607	4,867	▲58.10 %	
39	www.stks.or.th	2,217	2,904	9,226	▼7.86 %	
40	www.school.net.th	2,195	2,722	5,416	▼34.81 %	
41	www.ipst.ac.th/	2,133	3,875	5,420	▼2.96 %	
42	www.myfirstbrain.com	2,077	2,539	9,565	▲26.03 %	
43	www.thaiengineering.com	2,017	2,842	3,344	▼47.41 %	
44	www.panmai.com	1,883	3,321	9,369	▲14.82 %	
45	www.spufriends.com	1,859	2,044	2,893	▼1.54 %	
46	www.reg.chula.ac.th	1,798	3,307	3,584	▼38.28 %	
47	edltv.thai.net	1,762	2,610	15,402	▼7.99 %	
48	www.NetDesign.ac.th	1,750	2,131	4,726	▼23.25 %	
49	www.seal2thai.org	1,715	3,031	4,899	▼5.82 %	
50	www.thaifeed.net	1,700	2,911	5,857	▲6.99 %	
51	www.dpu.ac.th	1,670	3,368	8,074	▼6.49 %	
52	www.debsirin.ac.th	1,490	2,073	3,708	▲11.69 %	
53	www.bis.in.th	1,470	1,757	1,962	▲99.46 %	
54	www.srp.ac.th	1,439	2,152	4,180	▼13.78 %	
55	www.sisaketedu1.go.th	1,383	3,561	6,090	▲6.96 %	
56	tataya.com	1,365	2,212	4,414	▲0.74 %	
57	www.kanzuksa.com	1,323	1,629	5,597	▲28.32 %	
58	www.eanic.com	1,316	2,396	4,443	▼0.53 %	
59	www.kanid.com	1,281	1,645	4,318	▼14.83 %	
60	www.grad.mahidol.ac.th	1,242	3,589	11,738	▼19.61 %	

61	www.krupunmai.com	1,227	1,948	3,576	▼2.85 %	
62	www.rsu.ac.th	1,211	1,545	3,219	▼17.62 %	
63	www.muic.mahidol.ac.th	1,165	1,872	4,994	▲76.52 %	
64	www.enn.co.th	1,155	1,275	2,332	▼30.25 %	
65	www.lib.ku.ac.th	1,145	2,319	4,565	▼10.89 %	
66	www.rmutt.ac.th	1,145	1,692	2,414	▼29.32 %	
67	www.lawyerthai.com	1,098	1,692	3,125	▼51.26 %	
68	researchers.in.th	1,063	1,240	2,618	▼23.64 %	
69	www.hrcenter.co.th	1,037	1,298	2,743	▼1.8 %	
70	www.npc-se.co.th	974	1,412	5,250	▼4.51 %	
71	www.davance.com	962	1,584	2,086	▲16.46 %	
72	www.kodmhai.com	940	1,498	2,047	▼57.54 %	
73	www.jtdic.com	937	3,459	13,119	▼2.29 %	
74	www.pandintong.com	910	1,040	2,292	▼18.6 %	
75	www.sarakadee.com	902	1,047	2,470	▼0.88 %	
76	www.biotec.or.th	895	1,300	1,858	▼13.53 %	
77	www.thaitrainingzone.com	866	995	1,949	▼13.57 %	

TOP 1 - 500 Website หมวด บันเทิง ประจำเดือน ธันวาคม 2009						
ที่	ชื่อเว็บไซต์ (เรียงตาม Unique IP,Session,Pageview เฉลี่ยรายวัน)	Unique IP	Unique Session	Pageview		
1	www.sanook.com	646,039	2,715,697	12,763,652	▲0.65 %	
2	www.kapook.com	479,602	1,261,240	4,612,235	▲4.49 %	
3	www.dek-d.com	278,766	679,456	4,269,642	▲4.49 %	
4	teenee.com	261,478	760,398	3,733,432	▲1.32 %	
5	www.gmember.com	184,395	483,622	1,179,129	▼0.07 %	
6	www.truelife.com	169,098	297,558	988,645	▲75.51 %	
7	www.siamzone.com	152,748	274,454	1,337,822	▲7.59 %	
8	www.ohozaa.com	144,944	240,814	608,602	▼1.89 %	
9	www.meemodel.com	144,006	341,904	957,189	▲3.49 %	
10	www.siamha.com	139,320	302,654	1,141,538	▲5.71 %	
11	www.postjung.com	121,042	366,375	1,294,707	▲1.51 %	
12	www.venta4.com	109,051	171,864	640,302	▲0.10 %	
13	www.pleng.com	105,194	204,703	702,837	▲4.38 %	
14	www.clipmass.com	84,421	137,402	624,140	▼2.56 %	
15	www.konmun.com	76,781	162,966	237,315	▼1.28 %	
16	atcloud.com	76,499	114,960	387,311	▲3.13 %	
17	www.mwake.com	72,431	124,976	406,030	▲3.43 %	
18	www.hunsa.com	65,380	104,249	365,579	▼6.61 %	

19	www.zheza.com	65,094	107,548	349,476	▲7.55 %	
20	www.pukpik.com	61,976	95,259	333,180	▼6.58 %	
21	www.musicatm.com/	60,479	89,159	286,690	▲20.66 %	
22	flash-mini.com	56,688	76,224	227,198	▼6.61 %	
23	www.showded.com	55,670	70,865	181,757	▲0.71 %	
24	www.siamza.com	54,197	99,833	285,772	▲0.51 %	
25	www.you2play.com	53,784	81,255	235,908	▲26.95 %	
26	www.popcornfor2.com	50,547	88,817	458,217	▼1.86 %	
27	www.thaiza.com	44,653	60,859	211,385	▼1.66 %	
28	www.siamdara.com	43,879	61,894	388,118	▲12.66 %	
29	www.pingbook.com	41,449	73,862	389,520	▼5 %	
30	www.zubzip.com	37,097	50,489	142,392	▲9.92 %	
31	www.zabzaa.com	36,927	77,268	168,753	▲16.30 %	
32	www.yorkza.com	35,911	45,146	71,394	▲5.11 %	
33	www.zonezeed.com	35,378	48,871	77,105	▲8.60 %	
34	www.goosiam.com	34,265	79,409	268,612	▼0.81 %	
35	www.siamcomic.com	32,361	52,703	254,353	▲5.29 %	
36	www.mahamodo.com/	30,521	49,355	257,794	▲11.04 %	
37	www.zazana.com	29,365	45,615	78,688	▼1.24 %	
38	www.khonkaenlink.info	27,645	51,382	195,954	▲6.60 %	
39	www.kikuza.com	26,615	43,786	259,461	▲19.64 %	
40	majorcineplex.com	26,464	39,299	188,387	▲18.72 %	
41	www.fwdder.com	26,215	35,332	204,332	▲3.74 %	
42	www.bluegy.com	26,111	31,501	72,819	▼3.49 %	
43	soda-zaa.com	25,525	36,755	95,050	▼4.86 %	
44	www.nangdee.com	25,196	32,069	139,777	▼1.3 %	
45	www.daradaily.com	23,889	30,572	75,909	▲9.75 %	
46	www.unseencar.com	23,643	33,038	142,564	▲16.26 %	
47	www.madoo.com	20,942	61,532	108,400	▼28.54 %	
48	www.adintrend.com	20,284	24,744	81,303	▲0.30 %	
49	www.itmylike.com	19,374	29,544	39,896	▲6.09 %	
50	www.igossipy.com	18,255	23,682	109,999	▲1.26 %	
51	www.hi5thai.com	18,071	23,630	81,350	▼5.89 %	
52	kajeab.com	17,659	22,254	68,512	▲8.14 %	
53	www.2-teen.com	16,581	21,965	84,139	▲0.11 %	
54	www.chordtabs.in.th	15,906	26,458	126,273	▲9.00 %	
55	www.girlzeed.com	15,173	21,394	78,734	▲4.26 %	

56	www.thaiorc.com	14,649	19,319	46,610	5.16 %		
57	www.guitarthai.com	14,288	28,856	254,013	1.14 %		
58	www.charyen.com	13,646	18,601	71,910	36.82 %		
59	www.giggog.com	12,960	17,879	22,377	7.73 %		
60	www.showwallpaper.com	12,274	16,289	108,990	0.11 %		
61	www.numwan.com	12,169	22,237	44,823	1.8 %		
62	www.1000za.com	11,547	14,704	38,306	3.91 %		
63	www.thaiticketmajor.com	10,913	16,496	121,452	7.20 %		
64	www.soizaa.com	10,390	12,153	22,998	25.14 %		
65	www.zuzaaclub.com	9,543	12,547	31,730	5.85 %		
66	www.deedeejang.com	9,305	16,514	40,623	4.07 %		
67	www.yimsiam.com	9,072	10,923	24,046	61.26 %		
68	www.unlimitlife.com	8,920	11,361	30,649	1.86 %		
69	www.modxtoy.com	8,633	16,906	101,919	0.55 %		
70	www.nurnia.com	8,103	10,492	12,901	3.71 %		
71	www.clip-hot.com	7,962	9,537	29,984	23.08 %		
72	bkkonline.com	6,807	8,096	18,590	15.63 %		
73	www.baanjomyut.com	6,363	10,599	22,881	20.12 %		
74	www.sfcinemacity.com	6,357	8,425	19,839	0.36 %		
75	www.kik2you.com	6,150	9,498	18,524	9 %		
76	www.musicza.com	5,919	13,375	97,226	28.74 %		
77	www.kachon.com	5,866	12,235	39,939	1.01 %		

TOP 1 - 500 Website หมวด อื่นๆ ประจำเดือน ธันวาคม 2009							
ที่	ชื่อเว็บไซต์ (เรียงตาม Unique IP,Session,Pageview เฉลี่ยรายวัน)	Unique IP	Unique Session	Pageview			
1	www.212cafe.com	75,914	118,767	410,638	0.36 %		
2	www.igetweb.com	62,474	87,887	200,156	4.85 %		
3	www.thaiware.com	57,276	78,857	289,911	2.53 %		
4	www.longdo.com	43,079	103,802	411,456	2.2 %		
5	www.ob.tc	41,250	64,400	130,865	1.75 %		
6	www.uppic.net	38,497	52,316	99,838	68.08 %		
7	www.temppic.com	36,321	47,675	115,338	8.86 %		
8	www.gushare.com	34,231	63,849	153,364	2.6 %		
9	www.beupload.com	25,563	32,330	63,188	8.95 %		
10	www.hulashare.com	22,666	27,247	57,989	1.97 %		
11	www.upchill.com	22,664	40,056	142,543	2.13 %		
12	www.yimwhan.com	22,463	27,972	64,157	14.98 %		

13	www.thaicool.com	21,465	30,937	86,965	▼2.04 %	
14	www.lefthit.com	19,871	22,643	36,947	▼1.64 %	
15	uppicweb.com	18,559	22,310	50,793	▲19.95 %	
16	www.gigchat.com	18,344	30,006	89,806	▲4.06 %	
17	www.thaipromote.com	18,065	28,653	39,341	▼4.48 %	
18	www.thaimail.com	17,295	37,098	227,804	▼6.45 %	
19	www.uploadtoday.com	16,346	19,275	39,445	▼2.47 %	
20	www.haarai.com	14,890	20,183	23,589	▼2.44 %	
21	www.meeboard.com	11,225	20,297	39,677	▼36.13 %	
22	webindexthai.com	10,283	13,870	15,984	▼14.09 %	
23	zone-it.com	10,142	17,195	39,577	▲2.80 %	
24	www.thaiirc.com	9,701	26,622	31,686	▲14.08 %	
25	www.tantee.net	9,483	14,818	26,064	▼0.75 %	
26	www.buildboard.com	9,172	11,455	11,734	▲3.58 %	
27	www.makewebeasy.com	7,931	10,424	36,112	▼1.11 %	
28	www.siam2web.com	6,252	8,963	51,370	▲0.03 %	
29	www.thaimsn.net	5,972	8,950	12,285	▼15.53 %	
30	www.trueinternet.co.th/home.htm	5,058	6,609	15,018	▼25.82 %	
31	www.ruabruam.com	4,959	10,604	40,097	▲6.39 %	
32	www.webthaidd.com	4,399	8,283	17,278	▼10.28 %	
33	www.msn.in.th	4,284	9,724	39,228	▼15.97 %	
34	www.nipa.co.th	4,066	5,378	6,691	▼16.66 %	
35	www.ikkyonline.com	3,884	7,446	49,828	▲14.95 %	
36	www.officialwebsitepromotion.com	3,134	4,761	17,213	▼74.43 %	
37	myuppic.com	2,736	3,352	8,348	▲8.44 %	
38	websociety.biz	2,613	3,677	5,202	▼4.53 %	
39	www.uppicfast.com	2,601	3,089	5,843	▲92.24 %	
40	www.manyfile.com	2,432	2,967	4,954	▼17.08 %	
41	speedtest.or.th	2,429	5,964	7,214	▲10.46 %	
42	www.fhappy.com	2,213	4,580	10,483	▲181.19 %	
43	www.dlth.in.th	1,942	2,733	3,530	▼5.77 %	
44	www.thaidoweb.com	1,587	3,223	8,718	▲411.94 %	
45	www.netregis.com	1,453	1,945	2,892	▼2.61 %	
46	thaimisc.com	1,384	1,969	3,098	▼24.12 %	
47	www.gmwebsite.com	1,362	2,116	3,921	▼51.5 %	
48	www.up2box.com	1,320	2,183	3,007	▲6.88 %	
49	www.siamdoo.com	1,255	1,995	2,785	▼10.87 %	
50	www.codetukyang.com	1,131	2,566	5,215	▼0.53 %	
51	thaiirc.org	1,103	2,273	4,606	▼10.03 %	
52	www.thaifasthost.com	1,054	1,573	5,243	▼12.02 %	

53	www.csloxinfo.com	960	2,459	3,017	▼22.08 %		
54	www.thai76.com	920	1,253	1,458	▼36.94 %		
55	www.makewebez.com	872	1,076	4,331	▼1.8 %		
56	www.thaizone.com	825	1,004	1,123	▲3.25 %		
57	www.inet.co.th	763	1,274	1,960	▼18.31 %		
58	www.asis.co.th	757	1,623	3,196	▼56.12 %		
59	www.dwthai.com	730	1,173	2,256	▼9.43 %		
60	www.yakyaihost.net	725	954	2,031	▲28.55 %		
61	www.na-man.com	688	741	1,080	▲12.79 %		
62	www.TARADquickweb.com	658	956	1,793	▲1.70 %		
63	www.keng.com	648	916	1,274	▼18.28 %		
64	www.thaimess.com	598	765	880	▼60.24 %		
65	www.pawoot.com	586	863	1,227	▼9.43 %		
66	www.shopdd.in.th	569	675	1,992	▼16.2 %		
67	www.sappasan.com	544	719	1,481	▼21.84 %		
68	thaiportals.com	527	544	1,619	▼35.65 %		
69	www.truewifi.net	513	610	1,497	▲0.20 %		
70	www.porar.com	474	688	3,005	▼6.69 %		
71	www.chaiyohosting.com	406	528	1,190	▼16.46 %		
72	www.ji-net.com	388	531	952	▼13.59 %		
73	www.cmsthailand.com	350	603	1,155	▼30.42 %		
74	www.thaiddns.com	330	563	890	▲96.43 %		
75	www.easyhome.in.th	323	497	1,078	▼0.62 %		
76	www.toopornor.com	318	356	888	▼16.75 %		
77	www.smartzoneonline.com	293	1,370	1,656	▲1.03 %		

APPENDIX B

Web accessibility problems record (evaluated by A-prompt)

หน่วยงานราชการ ประจำเดือนธันวาคม 2009		Checkpoints													Total
อันดับที่	ชื่อเว็บไซต์ (เรียงตาม Unique IP)														
1	www.glo.or.th	65	4	3	0	0	1	0	0	0	0	0	0	0	73
2	www.obec.go.th	172	94	4	0	0	0	0	0	0	0	0	0	0	270
3	www.thaitambon.com	18	12	1	18	0	0	0	0	0	0	0	0	0	49
4	www.cm108.com	127	39	4	0	0	0	0	0	0	0	0	0	0	170
5	www.bot.or.th	7	8	1	0	0	1	0	0	0	0	0	0	0	17
6	www.thailocaladmin.go.th	8	3	1	10	0	1	0	0	0	0	0	0	0	23
7	www.rd.go.th	45	5	0	0	0	0	0	0	0	0	0	0	0	50
8	www.prd.go.th	0	33	0	0	0	1	0	0	0	0	0	0	0	34
9	www.ocsc.go.th	98	12	1	1	1	1	0	0	0	0	0	0	0	114
10	www.thailandpost.com	14	50	1	0	1	0	0	0	0	0	0	0	0	66
11	www.tpa.or.th	0	0	7	0	0	0	0	0	0	0	0	0	0	7
12	www.studentloan.or.th	9	5	4	0	0	0	0	0	0	0	0	0	0	18
13	www.mfa.go.th	38	26	1	0	0	1	6	0	0	0	0	0	0	72
14	www.sso.go.th	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	www.dopa.go.th	1	0	6	0	0	0	0	0	0	0	0	0	0	7
16	www.ismed.or.th	15	12	2	6	0	1	0	0	0	0	0	0	0	36
17	www.trf.or.th	183	12	1	0	0	0	0	0	0	0	0	0	0	196
18	www.consumerthai.org	14	18	1	0	0	0	0	0	0	0	0	0	0	33
19	www.whitemedia.org	4	20	3	0	0	0	0	0	0	0	0	0	0	27
20	www.sme.go.th	97	20	3	4	1	0	1	0	0	0	0	0	0	126
21	www.phtnet.org	10	1	1	0	0	0	0	0	0	0	0	0	0	12
22	www.stkc.go.th	37	23	5	0	2	0	0	0	0	0	0	0	0	67
23	www.dld.go.th	5	8	3	0	1	3	0	0	0	0	0	0	0	20
24	www.royin.go.th	251	13	6	0	1	1	0	0	0	0	0	0	0	272
25	www.culture.go.th	108	25	0	0	0	0	0	0	0	0	0	0	0	133
26	www.tistr.or.th	49	7	8	0	0	0	0	0	0	0	0	0	0	64
27	www.moe.go.th	274	58	8	1	3	3	0	0	0	0	0	0	0	347
28	www.rtaf.mi.th	0	0	0	0	0	0	2	0	0	0	0	0	0	2
29	www.dbd.go.th	65	19	2	0	0	1	0	0	0	0	0	0	0	87
30	www.doae.go.th	91	42	2	0	0	0	0	0	0	0	0	0	0	135
31	www.rakbankerd.com	3	0	0	0	0	0	0	0	0	0	0	0	0	3
32	www.thaibar.thaigov.net	51	7	0	0	0	4	0	0	0	0	0	0	0	62
33	www.sec.or.th	89	32	2	2	0	0	0	0	0	0	0	0	0	125
34	www.onesqa.or.th	276	36	5	0	1	3	0	0	0	0	0	0	0	321
35	www.clinictech.most.go.th	171	64	16	9	0	0	0	0	0	0	0	0	0	260
36	www.consular.go.th	48	97	1	0	0	4	0	0	0	0	0	0	0	150
37	www.rta.mi.th	23	22	0	0	0	0	0	0	0	0	0	0	0	45
38	www.nstda.or.th	2	0	25	0	0	0	0	0	0	0	0	0	0	27
39	www.mdh.obec.go.th	133	41	0	5	0	2	0	0	0	0	0	0	0	181
40	www.eppo.go.th	89	26	6	0	0	0	0	0	0	0	0	0	0	121
41	www.fda.moph.go.th	3	1	3	0	0	0	0	2	0	0	0	0	0	9
42	www.depthai.go.th/	3	5	3	0	0	0	0	0	0	0	0	0	0	11
43	www.tddf.or.th	0	0	0	0	0	0	0	0	0	0	0	0	0	0
44	www.mof.go.th	60	12	1	7	0	0	0	0	0	0	0	0	0	80
45	www.moc.go.th	56	3	1	0	0	3	0	0	0	0	0	0	0	63
46	www.nso.go.th	59	19	3	0	0	0	2	0	0	3	0	0	0	86
47	www.tisi.go.th	41	1	0	0	0	0	0	0	0	0	0	0	0	42
48	www.nectec.or.th	0	7	1	0	0	0	0	0	0	0	0	0	0	8

49	www.nicaonline.com	3	4	0	0	0	0	0	0	0	0	0	0	0	7
50	www.mol.go.th	108	9	9	0	0	2	0	0	0	0	0	0	0	128
51	www.most.go.th	0	12	0	0	0	0	0	0	0	0	0	0	0	12
52	www.energy.go.th	4	11	0	0	0	1	0	0	0	0	0	0	0	16
53	www.dede.go.th	5	37	0	0	0	0	0	0	0	0	0	0	0	42
54	www.moi.go.th	1	27	3	0	0	1	0	0	0	0	0	0	0	32
55	www.moac.go.th	115	16	7	2	0	1	0	0	0	0	0	0	0	141
56	www.pcd.go.th	123	16	2	0	0	1	0	0	0	0	0	0	0	142
57	www.rubberthai.com	38	3	0	0	0	0	0	5	0	0	0	0	0	46
58	siweb.dss.go.th	157	19	8	0	0	0	0	0	0	0	0	0	0	184
59	www.pwa.co.th	0	0	0	0	0	0	0	0	0	0	0	0	0	0
60	www.tistr-foodprocess.net	119	5	0	0	0	3	0	0	0	0	0	0	0	127
61	www.thaigov.go.th	15	7	3	0	0	1	0	0	0	1	0	0	0	27
62	www.mohanamai.com	104	20	7	0	1	0	0	0	0	0	0	0	0	132
63	www.codi.or.th	47	11	1	0	0	0	0	0	0	0	0	0	0	59
64	www.ipthailand.org	15	19	1	0	0	2	0	0	0	0	0	0	0	37
65	www.ruksadindan.com	54	36	4	0	0	2	0	0	0	0	0	0	0	96
66	www.exim.go.th	71	17	0	0	0	0	0	0	0	0	0	0	0	88
67	www.pea.co.th	3	22	2	0	3	1	0	0	0	0	0	0	0	31
68	www.dld.go.th/ict/	0	7	1	0	0	1	0	0	0	0	0	0	0	9
69	www.thaitradefair.com	22	10	2	0	0	0	0	0	0	0	0	0	0	34
70	www.coastalaqua.com	84	12	1	5	0	1	0	0	0	0	0	0	0	103
71	www.admincourt.go.th	5	7	0	10	0	0	0	0	0	0	0	0	0	22
72	www.moj.go.th	149	24	14	0	0	1	0	0	0	0	0	0	0	188
73	www.mwa.co.th	84	13	3	0	0	0	0	0	0	0	0	0	0	100
74	www.correct.go.th	110	28	2	2	1	0	0	0	0	0	0	0	0	143
75	www.suparsit.com	2	0	3	0	0	0	0	0	0	0	0	0	0	5
76	person.doae.go.th	52	11	8	2	0	1	0	0	0	0	0	0	0	74
77	www.phatlung.com	25	11	2	0	0	0	0	0	0	0	0	0	0	38


Image missing alternate text


Link missing alternate text


Form label missing


Server-side image map


Button missing alternate text

Marquee (a special effect of text moving)


Empty heading table

Frame missing title

Blinking content


Broken skip navigation link


Irrelevant image description

Irrelevant heading table

Difficult & misspelling word

ธุรกิจ ประจำเดือนธันวาคม 2009		Checkpoints													Total
อันดับที่	ชื่อเว็บไซต์ (เรียงตาม Unique IP)					GO	txt		title	blink			h?	th	
1	www.siamhrm.com	604	27	31	0	0	0	0	0	0	0	0	0	0	662
2	www.yellowpages.co.th	33	6	4	3	2	0	0	0	0	0	0	0	0	48
3	www.jobbkk.com	69	136	9	0	4	0	1	0	0	0	0	0	0	219
4	www.jobth.com	69	67	12	0	2	0	0	0	0	0	0	0	0	150
5	www.jobsdb.com/TH	22	26	8	0	3	0	0	0	0	0	0	0	0	59
6	www.dtac.co.th	6	0	0	0	0	0	0	0	0	0	0	0	0	6
7	www.jobthai.com	57	7	14	0	2	0	0	0	0	0	0	0	0	80
8	www.3bb.co.th	53	23	2	0	1	0	0	0	0	0	0	0	0	79
9	www.cmprice.com	13	13	5	0	0	0	0	0	0	0	0	0	0	31
10	www.happy.co.th	3	14	5	0	0	0	4	0	0	0	0	0	0	26
11	www.hflight.net	2	4	1	0	0	0	0	0	0	0	0	0	0	7
12	www.jobthaiweb.com	220	52	5	0	1	0	0	0	0	0	0	0	0	278
13	www.truecorp.co.th	1	1	0	0	0	0	0	0	0	0	0	0	0	2
14	www.thaieasyjob.com	43	23	12	0	0	0	0	0	0	0	0	0	0	78
15	www.buddyjob.com	0	16	6	0	0	0	0	0	0	0	0	0	0	22
16	www.tot.co.th	0	4	1	0	0	0	0	0	0	0	0	0	0	5
17	www.nationejobs.com	10	0	9	0	5	0	0	0	0	0	0	0	0	24
18	job.ocsc.go.th	28	8	4	0	0	0	0	0	0	0	0	0	0	40
19	www.jobduzy.com	482	24	19	0	0	0	0	0	0	0	0	0	0	525
20	www.tttonline.net	141	6	0	0	0	0	0	0	0	0	0	0	0	147
21	www.jobsiam.com	413	24	20	0	0	0	0	0	0	0	0	0	0	457
22	www.plazajob.com	27	0	6	0	0	0	0	0	0	0	0	0	0	33
23	www.joburl.com	11	2	8	0	0	1	0	0	0	0	0	0	0	22
24	www.nalueng.com	10	18	4	0	0	0	0	0	0	0	0	0	0	32
25	www.classifiedthai.com	217	277	3	0	0	0	0	0	0	0	0	0	0	497
26	www.ezyjob.com	68	12	10	0	0	0	0	0	0	0	0	0	0	90
27	www.thaicabincrew.com	24	20	0	0	0	0	0	0	0	0	0	0	0	44
28	www.thaifranchisecenter.com	370	47	14	0	4	0	0	0	0	0	0	0	0	435
29	www.siamjobonline.com	242	1	4	0	0	0	0	0	0	0	0	0	0	247
30	www.decha.com	0	0	0	0	0	0	0	0	0	0	0	0	0	0
31	www.agel-center.com	0	2	0	0	0	0	2	0	0	0	0	0	0	4
32	www.bts.co.th	75	35	4	0	0	1	0	0	0	0	0	0	0	115
33	www.500job.com	162	18	2	0	1	0	0	0	0	0	0	0	0	183
34	www.jobnorththailand.com	52	19	13	0	0	0	0	0	0	0	0	0	0	84
35	phonebook.tot.co.th	3	4	0	0	0	1	0	1	0	0	0	0	0	9
36	www.emthai.com	117	11	3	0	0	0	0	0	0	0	0	0	0	131
37	www.jobjob.co.th	3	14	3	0	1	0	0	0	0	0	0	0	0	21
38	hamsiam.com	0	2	5	0	0	0	0	1	0	0	0	0	0	8
39	www.icafeplus.net	24	17	0	0	3	0	0	0	0	0	0	0	0	44
40	marketingoops.com	3	7	2	0	0	0	0	0	0	0	0	0	0	12
41	www.appjob.com	71	67	12	0	2	0	0	0	0	0	0	0	0	152
42	www.thaiadpoint.com	5	8	2	0	0	0	0	0	0	0	0	0	0	15
43	www.roytawan.com	105	2	1	12	0	0	0	0	0	0	0	0	0	120
44	www.thailand.com	161	37	7	0	2	0	0	0	0	0	0	0	0	207
45	www.friend.co.th	369	37	4	0	0	0	0	0	0	0	0	0	0	410
46	www.jobant.com	301	29	7	0	0	2	0	0	0	0	0	0	0	339
47	www.cattelecom.com	17	18	1	0	0	0	0	0	0	0	0	0	0	36
48	www.jobtou.com	92	51	7	0	0	0	0	0	0	0	0	0	0	150
49	www.nanosoft.co.th	0	3	0	0	0	0	0	0	0	0	0	0	0	3
50	www.Omoneycenter.com	56	3	0	0	0	0	0	0	0	0	0	0	0	59
51	www.jobbyyou.com	11	0	0	0	0	0	0	0	0	0	0	0	0	11
52	www.thailandexhibition.com	13	46	6	0	0	0	0	0	0	0	0	0	0	65
53	www.jobdue.com	132	3	7	0	0	0	0	0	0	0	0	0	0	142
54	www.thaijobpost.com	15	14	0	3	0	0	0	0	0	0	0	0	0	32
55	www.mjob.in.th	37	2	11	0	0	1	0	0	0	0	0	0	0	51

56	www.dtvthai.com	3	25	0	11	0	0	0	0	0	0	0	0	0	**39**
57	www.paysbuy.com	0	4	11	0	1	0	0	0	0	0	0	0	0	**16**
58	www.jobbees.com	6	12	7	0	0	0	0	0	0	0	0	0	0	**25**
59	www.bangkokmetro.co.th	5	18	0	0	0	1	0	0	0	0	0	0	0	**24**
60	www.jobbangkok.com	0	0	2	0	0	0	0	0	0	0	0	0	0	**2**
61	www.commartthailand.com	5	8	0	0	0	0	2	0	0	0	0	0	0	**15**
62	www.pantavanij.com	26	0	1	7	0	0	0	0	0	0	0	0	0	**34**
63	www.qsncc.co.th	20	22	1	0	1	0	0	0	0	0	0	0	0	**44**
64	www.tcdcconnect.com	97	23	7	0	4	0	0	0	0	0	0	0	0	**131**
65	nukbunchee.com	60	9	5	6	1	0	0	0	0	0	0	0	0	**81**
66	www.pbair.com	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
67	www.bridgestone.co.th	1	6	0	0	0	0	0	0	0	0	0	0	0	**7**
68	www.thaifreelancebid.com	10	34	4	1	0	0	0	0	0	0	0	0	0	**49**
69	www.thaitelephone.com	51	37	0	0	0	0	0	0	0	0	0	0	0	**88**
70	www.ee-part.com	97	0	1	0	1	0	0	0	0	0	0	0	0	**99**
71	justindy.com/	32	11	1	0	0	1	0	0	0	0	0	0	0	**45**
72	www.archeep.com	25	0	0	0	0	1	0	0	0	0	0	0	0	**26**
73	www.pb-pac.com	0	22	0	0	0	0	0	0	0	0	0	0	0	**22**
74	www.thaiitjobs.com	35	4	3	0	2	0	0	0	0	0	0	0	0	**44**
75	www.adecco.co.th	6	7	0	0	0	0	0	0	0	0	0	0	0	**13**
76	www.jssr.co.th	0	35	0	0	0	0	0	0	0	0	0	0	0	**35**
77	www.mlm.in.th	20	8	5	0	0	1	0	0	0	0	0	0	0	**34**


Image missing alternate text


Link missing alternate text


Form label missing


Server-side image map

Button missing alternate text

Marquee (a special effect of text moving)


Empty heading table

Frame missing title

Blinking content


Broken skip navigation link


Irrelevant image description

Irrelevant heading table

Difficult & misspelling word

การศึกษา ประจำเดือนธันวาคม 2009		Checkpoints													Total
อันดับที่	ชื่อเว็บไซต์ (เรียงตาม Unique IP)					GO	txt		title	blink			h?	th	
1	www.eduzones.com	8	2	2	0	0	0	0	0	0	0	0	0	0	12
2	www.vcharkarn.com	151	69	3	6	0	0	0	0	0	0	0	0	0	229
3	gotoknow.org	0	1	0	0	0	0	0	0	0	0	0	0	0	1
4	www.thaigoodview.com	18	16	0	0	0	0	11	0	0	0	0	0	0	45
5	www.kroobannok.com	476	51	4	0	1	1	0	0	0	0	0	0	0	533
6	learners.in.th	0	4	0	0	0	0	0	0	0	0	0	0	0	4
7	panyathai.or.th	92	50	6	0	0	0	0	0	0	0	0	0	0	148
8	www.ru.ac.th	0	0	3	0	0	0	0	0	0	0	0	0	0	3
9	www.mahidol.ac.th	2	7	0	0	0	1	0	0	0	0	0	0	0	10
10	www.j-doramanga.com	62	35	1	0	0	0	2	0	0	0	0	0	0	100
11	www.rmutphysics.com	74	2	0	0	0	0	10	0	0	0	0	0	0	86
12	www.tumcivil.com	100	0	1	0	0	0	0	0	0	0	0	0	0	101
13	lexitron.nectec.or.th	2	0	4	0	0	1	0	0	0	0	0	0	0	7
14	www.spu.ac.th	2	24	1	0	0	1	0	0	0	0	0	0	0	28
15	www.ku.ac.th	70	44	1	0	0	0	0	0	0	0	0	0	0	115
16	www.thaiall.com	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17	www.icphysics.com	72	18	12	0	0	0	0	0	0	0	0	0	0	102
18	www.stou.ac.th	11	17	3	1	0	0	0	0	0	0	0	0	0	32
19	www.educatepark.com	55	4	0	2	0	0	0	0	0	0	0	0	0	61
20	www.sudipan.net	213	17	6	0	0	1	0	0	0	0	0	0	0	237
21	www.sema.go.th	5	11	0	0	0	0	3	0	0	0	0	0	0	19
22	www.unigang.com	0	0	1	0	1	0	0	0	0	0	0	0	0	2
23	www.siamdic.com	88	2	3	0	0	1	0	0	0	0	0	0	0	94
24	www.sahavicha.com	130	8	3	1	0	1	0	0	0	0	0	0	0	143
25	www.nidambe11.net	17	2	3	0	0	0	0	0	0	0	0	0	0	22
26	www.radompon.com	72	8	8	0	0	0	0	0	0	0	0	0	0	88
27	www.utcc.ac.th	2	20	6	5	0	0	0	0	0	0	0	0	0	33
28	www.karn.tv	147	29	0	0	0	1	0	0	0	0	0	0	0	177
29	www.lib.ru.ac.th	15	13	2	0	0	2	0	0	0	0	0	0	0	32
30	www.suanboard.net	234	0	6	0	0	0	0	0	0	0	0	0	0	240
31	www.psu.ac.th	0	2	0	0	0	0	0	0	0	0	0	0	0	2
32	www.chemtrack.org	205	20	11	0	0	1	0	0	3	0	0	0	0	240
33	www.maipradabonline.com	43	17	1	0	0	0	0	0	0	0	0	0	0	61
34	www.metukyang.com	95	24	9	0	0	0	0	0	0	0	0	0	0	128
35	bodinzone.com	53	7	3	0	1	0	0	0	0	0	0	0	0	64
36	thaiio.com	0	2	2	0	0	0	0	0	0	0	0	0	0	4
37	www.nu.ac.th	80	19	0	0	1	0	0	0	0	0	0	0	0	100
38	www.dusit.ac.th	51	11	0	2	0	0	0	0	0	0	0	0	0	64
39	www.stks.or.th	0	0	1	0	0	0	0	0	0	0	0	0	0	1
40	www.school.net.th	111	61	5	0	0	0	0	0	0	0	0	0	0	177
41	www.ipst.ac.th/	106	21	1	0	0	0	0	0	0	0	0	0	0	128
42	www.myfirstbrain.com	302	46	0	0	0	0	0	0	0	0	0	0	0	348
43	www.thaiengineering.com	0	0	0	0	0	0	0	2	0	0	0	0	0	2
44	www.panmai.com	54	0	4	2	0	0	0	0	0	0	0	0	0	60
45	www.spufriends.com	188	27	14	0	1	0	0	0	0	0	0	0	0	230
46	www.reg.chula.ac.th	26	10	0	1	0	1	0	0	0	0	0	0	0	38
47	edltv.thai.net	36	48	2	0	0	0	0	0	0	0	0	0	0	86
48	www.NetDesign.ac.th	59	83	8	6	3	0	0	0	0	0	0	0	0	159
49	www.seal2thai.org	10	0	0	0	0	0	0	0	0	0	0	0	0	10
50	www.thaifeed.net	76	0	0	0	0	0	0	0	0	0	0	0	0	76
51	www.dpu.ac.th	0	8	1	0	0	0	0	0	0	0	0	0	0	9
52	www.debsirin.ac.th	0	0	0	0	0	0	0	1	0	0	0	0	0	1
53	www.bis.in.th	44	8	2	0	0	0	0	0	0	0	0	0	0	54
54	www.srp.ac.th	70	20	2	0	0	0	0	0	0	0	0	0	0	92
55	www.sisaketedu1.go.th	64	37	2	0	0	0	0	0	0	0	0	0	0	103

56	tataya.com	64	2	0	0	0	0	0	0	0	0	0	0	0	**66**
57	www.kanzuksa.com	61	25	26	0	2	1	0	0	0	0	0	0	0	**115**
58	www.eanic.com	5	1	2	0	0	0	0	0	0	0	0	0	0	**8**
59	www.kanid.com	137	19	9	0	0	1	0	0	0	0	0	0	0	**166**
60	www.grad.mahidol.ac.th	81	6	1	1	0	0	0	0	0	0	0	0	0	**89**
61	www.krupunmai.com	59	6	9	0	0	0	1	0	0	0	0	0	0	**75**
62	www.rsu.ac.th	0	0	0	0	0	0	0	2	0	0	0	0	0	**2**
63	www.muic.mahidol.ac.th	0	0	2	0	0	0	0	0	0	0	0	0	0	**2**
64	www.enn.co.th	0	1	2	0	0	0	0	0	0	0	0	0	0	**3**
65	www.lib.ku.ac.th	1	13	3	0	0	0	0	0	0	0	0	0	0	**17**
66	www.rmutt.ac.th	2	1	0	13	0	0	0	0	0	0	0	0	0	**16**
67	www.lawyerthai.com	108	12	0	0	0	1	1	0	0	0	0	0	0	**122**
68	researchers.in.th	0	4	0	0	0	0	0	0	0	0	0	0	0	**4**
69	www.hrcenter.co.th	38	6	10	10	0	0	0	0	0	0	0	0	0	**64**
70	www.npc-se.co.th	134	9	2	0	2	1	4	0	0	0	0	0	0	**152**
71	www.davance.com	298	24	1	3	0	0	0	0	0	0	0	0	0	**326**
72	www.kodmhai.com	126	4	2	0	0	0	0	0	0	0	0	0	0	**132**
73	www.jtdic.com	1	0	0	0	0	0	0	0	0	0	0	0	0	**1**
74	www.pandintong.com	57	63	1	0	0	1	0	0	0	0	0	0	0	**122**
75	www.sarakadee.com	8	18	3	0	0	0	0	0	0	0	0	0	0	**29**
76	www.biotec.or.th	20	10	1	0	0	0	0	0	0	0	0	0	0	**31**
77	www.thaitrainingzone.com	64	10	0	0	0	1	0	0	0	0	0	0	0	**75**


Image missing alternate text


Link missing alternate text


Form label missing


Server-side image map

Button missing alternate text

Marquee (a special effect of text moving)


Empty heading table

Frame missing title

Blinking content


Broken skip navigation link


Irrelevant image description

Irrelevant heading table

Difficult & misspelling word

บันเทิง ประจำเดือนธันวาคม 2009		Checkpoints													Total
อันดับที่	ชื่อเว็บไซต์ (เรียงตาม Unique IP)					GO	txt		title	blink			h?	th	
1	www.sanook.com	1	3	16	0	2	0	0	0	0	0	0	0	0	22
2	www.kapook.com	34	42	12	0	1	0	0	0	3	0	0	0	0	92
3	www.dek-d.com	156	65	11	0	2	0	0	0	0	0	0	0	0	234
4	teenee.com	898	32	0	0	0	0	1	0	0	0	0	0	0	931
5	www.gmember.com	206	45	1	0	1	0	0	0	0	0	0	0	0	253
6	www.truelife.com	0	1	0	0	0	0	0	0	0	0	0	0	0	1
7	www.siamzone.com	28	61	2	0	0	0	0	0	0	0	0	0	0	91
8	www.ohozaa.com	3	4	0	0	0	0	0	0	0	0	0	0	0	7
9	www.meemodel.com	95	27	2	0	1	0	0	0	0	0	0	0	0	125
10	www.siamha.com	0	35	0	0	0	0	0	0	0	0	0	0	0	35
11	www.postjung.com	28	75	8	0	0	0	0	0	0	0	0	0	0	111
12	www.yenta4.com	0	11	9	0	0	0	0	0	0	0	0	0	0	20
13	www.pleng.com	8	12	4	0	0	0	0	0	0	0	0	0	0	24
14	www.clipmass.com	0	10	3	0	0	0	0	0	0	0	0	0	0	13
15	www.konmun.com	16	1	1	0	0	0	0	0	1	0	0	0	0	19
16	atcloud.com	16	250	5	0	0	0	5	0	0	0	0	0	0	276
17	www.mwake.com	12	0	0	0	0	0	0	0	0	0	0	0	0	12
18	www.hunsa.com	0	7	2	0	1	0	0	0	0	0	0	0	0	10
19	www.zheza.com	63	85	2	0	1	0	0	0	0	0	0	0	0	151
20	www.pukpik.com	272	33	9	0	0	0	0	0	0	0	0	0	0	314
21	www.musicatm.com/	0	3	4	0	0	0	1	0	0	0	0	0	0	8
22	flash-mini.com	33	33	4	0	0	0	0	0	1	0	0	0	0	71
23	www.showded.com	473	59	5	4	0	1	0	0	0	0	0	0	0	542
24	www.siamza.com	3	5	0	0	0	0	0	0	0	0	0	0	0	8
25	www.you2play.com	80	86	5	0	1	0	0	0	0	0	0	0	0	172
26	www.popcornfor2.com	7	1	5	0	0	0	0	0	0	0	0	0	0	13
27	www.thaiza.com	98	55	1	0	1	0	0	0	0	0	0	0	0	155
28	www.siamdara.com	299	140	0	0	0	0	0	0	0	0	0	0	0	439
29	www.pingbook.com	85	12	3	0	1	1	0	0	0	0	0	0	0	102
30	www.zubzip.com	0	11	0	0	1	0	0	0	0	0	0	0	0	12
31	www.zabzaa.com	232	19	9	0	0	0	0	0	0	0	0	0	0	260
32	www.yorkza.com	53	5	3	0	17	0	0	0	0	0	0	0	0	78
33	www.zonezeed.com	0	0	0	1	0	0	0	0	0	0	0	0	0	1
34	www.goosiam.com	5	0	0	6	0	0	0	0	0	0	0	0	0	11
35	www.siamcomic.com	417	36	7	0	1	1	0	0	0	0	0	0	0	462
36	www.mahamodo.com/	0	0	0	0	1	5	0	0	3	1	0	0	0	10
37	www.zazana.com	24	0	1	0	0	0	0	0	0	0	0	0	0	25
38	www.khonkaenlink.info	229	16	6	0	0	1	0	0	0	0	0	0	0	252
39	www.kikuza.com	0	0	3	0	0	0	0	0	0	0	0	0	0	3
40	majorcineplex.com	148	19	6	0	0	0	0	0	0	0	0	0	0	173
41	www.fwdder.com	89	53	7	1	0	0	0	0	0	0	0	0	0	150
42	www.bluegy.com	0	0	0	2	0	0	0	0	0	0	0	0	0	2
43	soda-zaa.com	110	107	0	0	0	0	0	0	0	0	0	0	0	217
44	www.nangdee.com	42	29	2	0	1	0	0	0	0	0	0	0	0	74
45	www.daradaily.com	113	9	1	0	0	0	0	0	0	0	0	0	0	123
46	www.unseencar.com	0	4	5	0	0	0	0	0	0	0	0	0	0	9
47	www.madoo.com	55	5	0	0	0	0	0	0	0	0	0	0	0	60
48	www.adintrend.com	82	50	5	0	0	0	0	0	0	0	0	0	0	137
49	www.itmylike.com	334	1	0	0	0	0	0	0	0	0	0	0	0	335
50	www.igossipy.com	292	42	14	0	1	1	0	0	0	0	0	0	0	350
51	www.hi5thai.com	4	34	7	0	0	0	0	0	0	0	0	0	0	45
52	kajeab.com	0	4	6	0	0	0	1	0	0	0	0	0	0	11
53	www.2-teen.com	13	44	4	0	0	0	0	0	0	0	0	0	0	61
54	www.chordtabs.in.th	1	14	0	0	0	1	0	0	0	0	0	0	0	16
55	www.girlzeed.com	25	37	0	0	0	0	0	0	0	0	0	0	0	62

56	www.thaiorc.com	84	4	0	0	0	0	0	0	0	0	0	0	0	**88**
57	www.guitarthai.com	48	54	1	0	0	0	0	0	0	0	0	0	0	**103**
58	www.charyen.com	188	29	0	0	0	0	0	0	0	0	0	0	0	**217**
59	www.giggog.com	108	12	0	0	0	0	0	0	0	0	0	0	0	**120**
60	www.showwallpaper.com	0	11	3	0	1	0	0	0	0	0	0	0	0	**15**
61	www.numwan.com	114	11	12	0	0	0	0	0	0	0	0	0	0	**137**
62	www.1000za.com	2	12	0	0	0	0	0	0	0	0	0	0	0	**14**
63	www.thaiticketmajor.com	16	56	13	1	1	3	0	0	0	0	0	0	0	**90**
64	www.soizaa.com	81	20	2	0	1	0	0	0	0	0	0	0	0	**104**
65	www.zuzaaclub.com	44	60	0	0	0	0	0	0	0	0	0	0	0	**104**
66	www.deedeejang.com	30	6	1	0	0	0	0	0	0	0	0	0	0	**37**
67	www.yimsiam.com	16	15	0	0	0	0	0	0	0	0	0	0	0	**31**
68	www.unlimitlife.com	44	5	0	0	0	0	0	0	0	0	0	0	0	**49**
69	www.modxtoy.com	107	48	3	0	2	0	0	0	0	0	0	0	0	**160**
70	www.nurnia.com	134	11	0	0	0	1	0	0	0	0	0	0	0	**146**
71	www.clip-hot.com	152	14	0	0	0	0	0	0	0	0	0	0	0	**166**
72	bkkonline.com	101	20	3	9	0	0	0	0	0	0	0	0	0	**133**
73	www.baanjomyut.com	123	0	1	0	0	0	0	0	0	0	0	0	0	**124**
74	www.sfcinemacity.com	0	1	0	2	0	0	0	0	0	0	0	0	0	**3**
75	www.kik2you.com	54	43	3	0	0	1	0	0	0	0	0	0	0	**101**
76	www.musicza.com	9	1	0	0	0	0	0	0	0	0	0	0	0	**10**
77	www.kachon.com	0	11	0	0	0	0	0	0	0	0	0	0	0	**11**


Image missing alternate text


Link missing alternate text


Form label missing


Server-side image map


Button missing alternate text

Marquee (a special effect of text moving)


Empty heading table

Frame missing title

Blinking content


Broken skip navigation link


Irrelevant image description

Irrelevant heading table

Difficult & misspelling word

อื่นๆ ประจำเดือนธันวาคม 2009		Checkpoints													Total
อันดับที่	ชื่อเว็บไซต์ (เรียงตาม Unique IP)					GO	txt		title	blink			h?	th	
1	www.212cafe.com	80	13	3	0	0	1	0	0	0	0	0	0	0	97
2	www.igetweb.com	0	1	13	0	2	0	0	0	0	0	0	0	0	16
3	www.thaiware.com	218	12	0	0	0	0	0	0	0	0	0	0	0	230
4	www.longdo.com	8	3	2	0	0	0	0	0	0	0	0	0	0	13
5	www.ob.tc	96	44	19	2	0	0	0	0	0	0	0	0	0	161
6	www.uppic.net	1	0	2	0	0	0	0	0	0	0	0	0	0	3
7	www.temppic.com	3	0	7	0	0	0	0	0	0	0	0	0	0	10
8	www.gushare.com	0	1	0	0	3	0	1	0	0	0	0	0	0	5
9	www.beupload.com	5	0	7	0	0	0	0	0	0	0	0	0	0	12
10	www.hulashare.com	0	0	7	0	0	0	0	0	0	0	0	0	0	7
11	www.upchill.com	11	5	0	0	0	0	0	0	0	0	0	0	0	16
12	www.yimwhan.com	112	34	4	0	2	0	0	0	0	0	0	0	0	152
13	www.thaicool.com	308	34	4	0	0	0	0	0	0	0	0	0	0	346
14	www.lefthit.com	12	3	3	0	0	0	0	0	0	0	0	0	0	18
15	uppicweb.com	0	8	3	0	0	0	0	0	0	0	0	0	0	11
16	www.gigchat.com	169	28	0	0	1	0	0	0	0	0	0	0	0	198
17	www.thaipromote.com	40	26	1	0	0	0	0	0	0	0	0	0	0	67
18	www.thaimail.com	20	2	6	0	0	0	0	0	0	0	0	0	0	28
19	www.uploadtoday.com	7	4	4	0	0	0	0	0	0	0	0	0	0	15
20	www.haarai.com	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21	www.meeboard.com	34	5	10	0	0	1	0	0	0	0	0	0	0	50
22	webindexthai.com	17	9	1	0	1	0	0	0	0	0	0	0	0	28
23	zone-it.com	75	10	0	0	0	0	0	0	0	0	0	0	0	85
24	www.thaiirc.com	69	3	0	0	0	0	0	0	0	0	0	0	0	72
25	www.tantee.net	24	1	2	0	0	0	0	0	0	0	0	0	0	27
26	www.buildboard.com	105	1	2	0	0	0	0	0	0	0	0	0	0	108
27	www.makewebeasy.com	108	15	2	0	0	0	0	0	0	0	0	0	0	125
28	www.siam2web.com	20	3	4	0	2	0	0	0	0	0	0	0	0	29
29	www.thaimsn.net	48	41	8	3	0	0	0	0	0	0	0	0	0	100
30	www.trueinternet.co.th/home.html	13	12	2	0	0	0	0	0	0	0	0	0	0	27
31	www.ruabruam.com	0	0	2	0	0	0	0	0	0	0	0	0	0	2
32	www.webthaidd.com	287	32	5	0	0	0	0	0	0	0	0	0	0	324
33	www.msn.in.th	6	7	3	0	0	1	0	0	0	0	0	0	0	17
34	www.nipa.co.th	36	3	2	0	0	1	0	0	0	0	0	0	0	42
35	www.ikkyonline.com	7	10	1	0	0	0	0	0	0	0	0	0	0	18
36	www.officialwebsitepromotion.com	5	0	0	2	0	0	0	0	0	0	0	0	0	7
37	myuppic.com	1	4	1	0	0	0	0	0	0	0	0	0	0	6
38	websociety.biz	0	0	19	0	0	1	0	0	0	0	0	0	0	20
39	www.uppicfast.com	23	9	48	0	0	0	0	0	0	0	0	0	0	80
40	www.manyfile.com	12	2	4	0	0	0	0	0	0	0	0	0	0	18
41	speedtest.or.th	39	0	0	0	0	0	0	0	0	0	0	0	0	39
42	www.fhappy.com	6	4	0	0	0	0	0	0	0	0	0	0	0	10
43	www.dlth.in.th	5	26	3	0	0	1	0	0	0	0	0	0	0	35
44	www.thaidoweb.com	0	0	1	0	1	0	0	0	0	0	0	0	0	2
45	www.netregis.com	30	36	27	1	0	0	0	0	0	0	0	0	0	94
46	thaimisc.com	105	9	5	0	0	0	0	0	0	0	0	0	0	119
47	www.gmwebsite.com	46	34	3	0	1	0	0	0	0	0	0	0	0	84
48	www.up2box.com	2	10	0	0	0	0	0	0	0	0	0	0	0	12
49	www.siamdoo.com	6	3	1	0	0	0	0	0	0	0	0	0	0	10
50	www.codetukyang.com	12	2	11	0	0	0	0	0	0	0	0	0	0	25
51	thaiirc.org	27	2	0	5	0	0	0	0	0	0	0	0	0	34
52	www.thaifasthost.com	0	3	0	0	0	0	0	0	0	0	0	0	0	3
53	www.csloxinfo.com	6	18	2	4	0	0	0	0	0	0	0	0	0	30
54	www.thai76.com	190	14	1	0	0	0	0	0	0	0	0	0	0	205
55	www.makewebez.com	107	15	2	0	0	0	0	0	0	0	0	0	0	124

56	www.thaizone.com	0	0	2	0	0	0	0	0	0	0	0	0	0	**2**
57	www.inet.co.th	48	24	3	7	0	0	0	0	0	0	0	0	0	**82**
58	www.asis.co.th	10	16	0	0	0	0	0	0	0	0	0	0	0	**26**
59	www.dwthai.com	8	2	12	0	0	0	0	0	0	0	0	0	0	**22**
60	www.yakyaihost.net	8	4	0	0	0	0	0	0	0	0	0	0	0	**12**
61	www.na-man.com	4	0	0	0	0	0	0	0	1	0	0	0	0	**5**
62	www.TARADquickweb.com	81	14	3	0	0	0	0	0	0	0	0	0	0	**98**
63	www.keng.com	0	6	2	0	1	0	0	0	0	0	0	0	0	**9**
64	www.thaimess.com	27	11	8	0	0	0	0	0	0	0	0	0	0	**46**
65	www.pawoot.com	0	4	3	0	0	0	0	0	0	0	0	0	0	**7**
66	www.shopdd.in.th	0	33	18	0	6	5	0	0	0	0	0	0	0	**62**
67	www.sappasan.com	23	33	13	0	0	1	0	0	0	0	0	0	0	**70**
68	thaiportals.com	0	0	1	0	0	0	0	0	0	0	0	0	0	**1**
69	www.truewifi.net	4	3	0	0	0	0	0	0	0	0	0	0	0	**7**
70	www.porar.com	17	4	1	0	0	0	0	0	0	0	0	0	0	**22**
71	www.chaiyohosting.com	124	0	3	0	0	0	0	0	0	0	0	0	0	**127**
72	www.ji-net.com	178	3	1	0	0	0	0	0	0	0	0	0	0	**182**
73	www.cmsthailand.com	130	1	0	0	0	0	0	0	0	0	0	0	0	**131**
74	www.thaiddns.com	144	25	5	0	1	0	0	0	0	0	0	0	0	**175**
75	www.easyhome.in.th	27	0	2	0	0	0	0	0	0	0	0	0	0	**29**
76	www.toopornor.com	1	0	0	0	0	0	1	0	0	0	0	0	0	**2**
77	www.smartzoneonline.com	6	3	1	0	0	0	0	0	0	0	0	0	0	**10**


Image missing alternate text


Link missing alternate text


Form label missing


Server-side image map


Button missing alternate text

Marquee (a special effect of text moving)


Empty heading table

Frame missing title

Blinking content


Broken skip navigation link


Irrelevant image description


Irrelevant heading table


Difficult & misspelling word

APPENDIX C

Data checklist and case report form (evaluated by blind users)

แบบบันทึกปัญหาในการเข้าถึงเว็บไซต์สำหรับคนตาบอดในประเทศไทย

คำชี้แจง (อ่านออกเสียงให้ผู้เข้าร่วมการวิจัยฟังก่อนทำการบันทึก)

โครงการวิจัยนี้ทำขึ้นเพื่อสำรวจจำนวนเว็บไซต์ในประเทศไทยที่เข้าถึงได้ และศึกษาถึงปัญหาที่คนตาบอดประสบในการเข้าถึงเว็บไซต์ในประเทศไทย ซึ่งจะมีประโยชน์ที่คาดว่าจะได้รับคือ เพื่อเป็นข้อมูลพื้นฐานในการพัฒนาการออกแบบเว็บไซต์ให้เข้าถึงได้สำหรับคนตาบอด ทำให้คนตาบอดสามารถใช้งานเว็บไซต์ได้อย่างเท่าเทียมกับคนทั่วไปในที่สุด

ท่านได้รับเชิญให้เข้าร่วมการวิจัยนี้เพราะท่านเป็นคนตาบอดที่มีความสามารถในการใช้โปรแกรม JAWS อ่านจอภาพเพื่อเข้าถึงข้อมูลในเว็บไซต์ในชีวิตประจำวันได้ จึงมีคุณสมบัติเหมาะสมที่จะเป็นผู้ระบุปัญหาที่ประสบในการใช้งานเว็บไซต์ในประเทศไทย

ส่วนที่ 1 ข้อมูลทั่วไปของผู้เข้าร่วมวิจัย

1. เพศ ❍ ชาย ❍ หญิง
2. อายุ ..... ปี
3. ใช้โปรแกรม JAWS อ่านจอภาพมาเป็นเวลา..... ปี
4. ความถี่ในการใช้งานเว็บไซต์
   - ❍ ทุกวัน (100%)
   - ❍ 5-6 วันต่อสัปดาห์ (75%)
   - ❍ 3-4 วันต่อสัปดาห์ (50%)
   - ❍ 1-2 วันต่อสัปดาห์ (25%)
5. ตัวอย่างเว็บไซต์ที่ใช้งานเป็นประจำ ได้แก่
   - 5.1 .....
   - 5.2 .....

5.3 .....

5.4 .....

5.5 .....

ส่วนที่ 2 ปัญหาที่พบระหว่างการใช้งานเว็บไซต์

คำชี้แจง (อ่านออกเสียงให้ผู้เข้าร่วมการวิจัยฟังก่อนทำการบันทึก)

ท่านจะได้ทำการทดสอบการใช้งานเว็บไซต์ที่กำหนดจำนวน 5 เว็บไซต์ (โดยคัดเลือกมาจากเว็บไซต์ที่ได้รับความนิยมเป็นอันดับหนึ่งตามสถิติเว็บไทยในหมวดต่างๆ รวม 5 หมวด) ตามขั้นตอนดังนี้

2.1 ผู้วิจัยจะเปิดหน้าเว็บไว้ให้ก่อนจะเริ่มจับเวลา เพื่อให้ท่านได้ลองสำรวจปัญหาที่พบได้ในระหว่างการใช้งานเว็บไซต์นั้นๆ (เว็บละไม่เกิน 20 นาที เพื่อไม่ให้ท่านเกิดความเหนื่อยล้าเกินไป)

2.2 ท่านสามารถระบุปัญหาที่พบระหว่างการใช้งานเว็บไซต์ได้โดยไม่ต้องทำการจดบันทึกเองแต่อาศัยการพูดอธิบายให้ผู้วิจัยฟัง ซึ่งผู้วิจัยจะทำการบันทึกลงในแบบบันทึกฉบับนี้

(มีการแยกแยะหมวดหมู่ของปัญหาตามเกณฑ์ในการออกแบบเว็บไซต์ให้เข้าถึงได้)

2.3 ท่านสามารถเลือกใช้วิธีการเข้าถึงข้อมูลในเว็บไซต์ตามรูปแบบที่ท่านถนัด และสามารถขอหยุดการทดสอบได้ตามต้องการ หรือหยุดเมื่อท่านคิดว่าได้สำรวจปัญหาจนครบถ้วนแล้ว

2.4 เมื่อการทดสอบเว็บไซต์แรกสิ้นสุดลง ผู้วิจัยจะเว้นช่วงหยุดพักประมาณ 5-10 นาที เพื่อให้ท่านได้พักผ่อนหรือทำกิจธุระส่วนตัว ในขณะเดียวกันผู้วิจัยจะเตรียมความพร้อมสำหรับการทดสอบเว็บไซต์ถัดไป

2.5 การดำเนินการทดสอบจะเป็นไปตามขั้นตอนดังกล่าว จนครบจำนวน 5 เว็บไซต์

เว็บไซต์ที่ 1 ..... (หมวดเว็บไซต์ภาครัฐและองค์กรต่างๆ)

ข้อ	ลักษณะของปัญหาที่อาจพบได้	พบปัญหา	หมายเหตุ
1.	ไม่มีข้อความอธิบายรูปภาพกราฟิกต่างๆ ในหน้าเว็บ		
2.	ไม่มีคำอธิบายจุดเชื่อมโยง (link) ในหน้าเว็บ		
3.	ไม่มีการระบุข้อมูลที่ต้องการให้ผู้ใช้กรอกหรือเลือกตอบในแบบฟอร์มต่างๆ		
4.	ไม่มีการใช้ข้อความเป็นจุดเชื่อมโยง (text link) เพื่อเพิ่มทางเลือก นอกเหนือจากการใช้ภาพ image map		

	ทาง server เป็นจุดเชื่อมโยงไปยังส่วนอื่นๆ ของเว็บ		
5.	ไม่มีคำอธิบายปุ่มคำสั่งต่างๆ เช่น การ submit หรือ reset ข้อมูลที่กรอกลงในแบบฟอร์ม		
6.	มีการใช้เทคนิคพิเศษ เช่น ตัวอักษรวิ่ง (marquee)		
7.	มีการใช้ภาพกะพริบเพื่อดึงดูดสายตา		
8.	ไม่มีการระบุชื่อหัวข้อของตาราง ในแต่ละแถว และแต่ละคอลัมน์		
9.	ไม่มีการตั้งชื่อ frame ในกรณีที่ใช้ frame เพื่อกำหนดให้บางส่วนของเว็บไม่เคลื่อนที่ไปตามการอ่านหน้าเว็บของผู้ใช้		
10.	มีจุดเชื่อมโยงที่ไม่สามารถใช้งานได้จริง		
11.	ไม่เข้าใจความหมายของคำในภาษาที่ใช้ จากการสะกดผิดหรือใช้คำศัพท์ที่ซับซ้อนเกินไป		
12.	คำอธิบายภาพกับเนื้อหาของภาพไม่สัมพันธ์กัน		
13.	ข้อมูลในตารางกับหัวข้อไม่สัมพันธ์กัน		

ปัญหาอื่นๆ ที่พบ (ถ้ามี) .....

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เว็บไซต์ที่ 2 ..... (หมวดเว็บไซต์ด้านธุรกิจการค้า)

ข้อ	ลักษณะของปัญหาที่อาจพบได้	พบปัญหา	หมายเหตุ
1.	ไม่มีข้อความอธิบายรูปภาพกราฟิกต่างๆ ในหน้าเว็บ		
2.	ไม่มีคำอธิบายจุดเชื่อมโยง (link) ในหน้าเว็บ		
3.	ไม่มีการระบุข้อมูลที่ต้องการให้ผู้ใช้กรอกหรือเลือกตอบในแบบฟอร์มต่างๆ		
4.	ไม่มีการใช้ข้อความเป็นจุดเชื่อมโยง (text link) เพื่อเพิ่มทางเลือก นอกเหนือจากการใช้ภาพ image map		

	ทาง server เป็นจุดเชื่อมโยงไปยังส่วนอื่นๆ ของเว็บ		
5.	ไม่มีคำอธิบายปุ่มคำสั่งต่างๆ เช่น การ submit หรือ reset ข้อมูลที่กรอกลงในแบบฟอร์ม		
6.	มีการใช้เทคนิคพิเศษ เช่น ตัวอักษรวิ่ง (marquee)		
7.	มีการใช้ภาพกะพริบเพื่อดึงดูดสายตา		
8.	ไม่มีการระบุชื่อหัวข้อของตาราง ในแต่ละแถว และแต่ละคอลัมน์		
9.	ไม่มีการตั้งชื่อ frame ในกรณีที่ใช้ frame เพื่อกำหนดให้บางส่วนของเว็บไม่เคลื่อนที่ไปตามการอ่านหน้าเว็บของผู้ใช้		
10.	มีจุดเชื่อมโยงที่ไม่สามารถใช้งานได้จริง		
11.	ไม่เข้าใจความหมายของคำในภาษาที่ใช้ จากการสะกดผิดหรือใช้คำศัพท์ที่ซับซ้อนเกินไป		
12.	คำอธิบายภาพกับเนื้อหาของภาพไม่สัมพันธ์กัน		
13.	ข้อมูลในตารางกับหัวข้อไม่สัมพันธ์กัน		

ปัญหาอื่นๆ ที่พบ (ถ้ามี) .....

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เว็บไซต์ที่ 3 ..... (หมวดเว็บไซต์ด้านการศึกษา)

ข้อ	ลักษณะของปัญหาที่อาจพบได้	พบปัญหา	หมายเหตุ
1.	ไม่มีข้อความอธิบายรูปภาพกราฟิกต่างๆ ในหน้าเว็บ		
2.	ไม่มีคำอธิบายจุดเชื่อมโยง (link) ในหน้าเว็บ		
3.	ไม่มีการระบุข้อมูลที่ต้องการให้ผู้ใช้กรอกหรือเลือกตอบในแบบฟอร์มต่างๆ		
4.	ไม่มีการใช้ข้อความเป็นจุดเชื่อมโยง (text link) เพื่อเพิ่มทางเลือก นอกเหนือจากการใช้ภาพ image map		

	ทาง server เป็นจุดเชื่อมโยงไปยังส่วนอื่นๆ ของเว็บ		
5.	ไม่มีคำอธิบายปุ่มคำสั่งต่างๆ เช่น การ submit หรือ reset ข้อมูลที่กรอกลงในแบบฟอร์ม		
6.	มีการใช้เทคนิคพิเศษ เช่น ตัวอักษรวิ่ง (marquee)		
7.	มีการใช้ภาพกะพริบเพื่อดึงดูดสายตา		
8.	ไม่มีการระบุชื่อหัวข้อของตาราง ในแต่ละแถว และแต่ละคอลัมน์		
9.	ไม่มีการตั้งชื่อ frame ในกรณีที่ใช้ frame เพื่อกำหนดให้บางส่วนของเว็บไม่เคลื่อนที่ไปตามการอ่านหน้าเว็บของผู้ใช้		
10.	มีจุดเชื่อมโยงที่ไม่สามารถใช้งานได้จริง		
11.	ไม่เข้าใจความหมายของคำในภาษาที่ใช้ จากการสะกดผิดหรือใช้คำศัพท์ที่ซับซ้อนเกินไป		
12.	คำอธิบายภาพกับเนื้อหาของภาพไม่สัมพันธ์กัน		
13.	ข้อมูลในตารางกับหัวข้อไม่สัมพันธ์กัน		

ปัญหาอื่นๆ ที่พบ (ถ้ามี) .....

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เว็บไซต์ที่ 4 ..... (หมวดเว็บไซต์ด้านความบันเทิง)

ข้อ	ลักษณะของปัญหาที่อาจพบได้	พบปัญหา	หมายเหตุ
1.	ไม่มีข้อความอธิบายรูปภาพกราฟิกต่างๆ ในหน้าเว็บ		
2.	ไม่มีคำอธิบายจุดเชื่อมโยง (link) ในหน้าเว็บ		
3.	ไม่มีการระบุข้อมูลที่ต้องการให้ผู้ใช้กรอกหรือเลือกตอบในแบบฟอร์มต่างๆ		
4.	ไม่มีการใช้ข้อความเป็นจุดเชื่อมโยง (text link) เพื่อเพิ่มทางเลือก นอกเหนือจากการใช้ภาพ image map		

	ทาง server เป็นจุดเชื่อมโยงไปยังส่วนอื่นๆ ของเว็บ		
5.	ไม่มีคำอธิบายปุ่มคำสั่งต่างๆ เช่น การ submit หรือ reset ข้อมูลที่กรอกลงในแบบฟอร์ม		
6.	มีการใช้เทคนิคพิเศษ เช่น ตัวอักษรวิ่ง (marquee)		
7.	มีการใช้ภาพกะพริบเพื่อดึงดูดสายตา		
8.	ไม่มีการระบุชื่อหัวข้อของตาราง ในแต่ละแถว และแต่ละคอลัมน์		
9.	ไม่มีการตั้งชื่อ frame ในกรณีที่ใช้ frame เพื่อกำหนดให้บางส่วนของเว็บไม่เคลื่อนที่ไปตามการอ่านหน้าเว็บของผู้ใช้		
10.	มีจุดเชื่อมโยงที่ไม่สามารถใช้งานได้จริง		
11.	ไม่เข้าใจความหมายของคำในภาษาที่ใช้จากการสะกดผิดหรือใช้คำศัพท์ที่ซับซ้อนเกินไป		
12.	คำอธิบายภาพกับเนื้อหาของภาพไม่สัมพันธ์กัน		
13.	ข้อมูลในตารางกับหัวข้อไม่สัมพันธ์กัน		

ปัญหาอื่นๆ ที่พบ (ถ้ามี) .....

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เว็บไซต์ที่ 5 .....

(หมวดเว็บไซต์อื่นๆ เช่น กระดานสนทนา ชุมชนออนไลน์ หรือผู้ให้บริการอินเตอร์เน็ต)

ข้อ	ลักษณะของปัญหาที่อาจพบได้	พบปัญหา	หมายเหตุ
1.	ไม่มีข้อความอธิบายรูปภาพกราฟิกต่างๆ ในหน้าเว็บ		
2.	ไม่มีคำอธิบายจุดเชื่อมโยง (link) ในหน้าเว็บ		
3.	ไม่มีการระบุข้อมูลที่ต้องการให้ผู้ใช้กรอกหรือเลือกตอบในแบบฟอร์มต่างๆ		
4.	ไม่มีการใช้ข้อความเป็นจุดเชื่อมโยง (text link) เพื่อ		

	เพิ่มทางเลือก นอกเหนือจากการใช้ภาพ image map ทาง server เป็นจุดเชื่อมโยงไปยังส่วนอื่นๆ ของเว็บ		
5.	ไม่มีคำอธิบายปุ่มคำสั่งต่างๆ เช่น การ submit หรือ reset ข้อมูลที่กรอกลงในแบบฟอร์ม		
6.	มีการใช้เทคนิคพิเศษ เช่น ตัวอักษรวิ่ง (marquee)		
7.	มีการใช้ภาพกะพริบเพื่อดึงดูดสายตา		
8.	ไม่มีการระบุชื่อหัวข้อของตาราง ในแต่ละแถว และแต่ละคอลัมน์		
9.	ไม่มีการตั้งชื่อ frame ในกรณีที่ใช้ frame เพื่อกำหนดให้บางส่วนของเว็บไม่เคลื่อนที่ไปตามการอ่านหน้าเว็บของผู้ใช้		
10.	มีจุดเชื่อมโยงที่ไม่สามารถใช้งานได้จริง		
11.	ไม่เข้าใจความหมายของคำในภาษาที่ใช้ จากการสะกดผิดหรือใช้คำศัพท์ที่ซับซ้อนเกินไป		
12.	คำอธิบายภาพกับเนื้อหาของภาพไม่สัมพันธ์กัน		
13.	ข้อมูลในตารางกับหัวข้อไม่สัมพันธ์กัน		

ปัญหาอื่นๆ ที่พบ (ถ้ามี) .....

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ส่วนที่ 3 ข้อเสนอแนะเพิ่มเติมในการออกแบบเว็บไซต์ให้คนตาบอดเข้าถึงได้

คำชี้แจง กรุณาให้ข้อเสนอแนะเพื่อการออกแบบเว็บไซต์ให้คนตาบอดเข้าถึงได้ตามความเห็นของท่าน

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COA. No. MU-IRB 2009/350.2912

Documentary Proof of Mahidol University Institutional Review Board

Title of Project: A Study of Accessible Websites for Blind Users in Thailand
(Thesis for Master Degree)

Principle Investigator: Mrs. Nawita Sundaravej

Name of Institution: Ratchasuda College

Approval includes: 1) MU-IRB Submission form version received date 25 December 2009
2) Participant Information Sheet version date 25 December 2009
3) Informed Consent form version date 5 November 2009
4) Case Record Form version received date 5 December 2009

Mahidol University Institutional Review Board is in full compliance with International Guidelines for Human Research Protection such as Declaration of Helsinki, The Belmont Report, CIOMS Guidelines and the International Conference on Harmonization in Good Clinical Practice (ICH-GCP)

Date of Approval: 29 December 2009

Date of Expiration: 28 December 2010

Signature of Chairman: .....
(Professor Shusee Visalyaputra)

Signature of Head of the Institute: .....
(Associate Professor Sansanee Chaiyaroj)
Vice President for Research and Academic Affairs

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