

# ACCESSIBILITY OF DISABILITY STUDENTS ON ELEARNING EDUCATION in ASEAN COMMUNITY

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## Abstract

More than a decade ago, internet had gradually come to play a major role in the world as it was an advance technological tool provided various benefits to human being. Internet could also influence in educational field because it was the advance media to create distance learning in term of online learning or eLearning, which could allow students in different locations to join the same class in the same time. Therefore, many universities and colleges worldwide have turned to focus on eLearning class instead of traditional class. ELearning could also benefit to whole ASEAN community as it is the mode of education allows students in all 10 countries to study together as well as to improve educational standard for whole community. ELearning also help people with disability in ASEAN to access learning easily and help them to fulfill their education requirement. However, even though eLearning is the mode of education allowed everyone to access, but people with disability still face difficulty to access the eLearning websites as equal as ordinary students. So, in order to create equality for all students in ASEAN to gain benefit from eLearning mode of studying, all eLearning websites should be focused on the issue of accessibility to facilitate students with disability. This paper therefore would be proposed the factors to create effective eLearning for education in ASEAN, and necessary components required to create accessibility of eLearning for disability students in ASEAN. This paper could summarize that there were four factors to create effective eLearning for education and the eLearning website must consists of four components to support disability students.

**Keywords:** ELearning, Education, ASEAN community, disability students, web accessibility components

## Introduction

More than a decade ago, the World Wild Web or known as WWW for short became a new gateway to communicate. It also called Internet is a most popular thing and wild spread to almost every households. People are now communicate to each other and sharing information as fast as a matter of second. As fast as the technology changed the Internet became one of a valuable tool for distance learning. As the economy grew

alongside the technology, distance learning has become one of a high profit margin in education industry.

ELearning websites is the advance developed tool in the twenty-first century which will generate new era of education under the concept of anyone can study in anywhere at any time. ELearning could generate benefit to students in different location to join the same class of studying.

Many Universities and Colleges throughout the world have turned their focuses from a traditional face-to-face classroom to a new way of learning at-home-base classroom, which fit many life who don't have the luxury of times, transportation, and importantly financial. According to Arrigo (2002), since the middle of the 1990s, the number of colleges and universities which have provided courses and degree programs via eLearning mode has been growing dramatically. And in 2005, as one of the example of many universities, The University of Phoenix had a high number of online learners of more than 140,000 and earned approximately 5,700 million baht per year (Charmonman, 2005).

For ASEAN community, as many reasons from many researches and case studies, there are still many more strategies and models to develop under many circumstances throughout the learning process and preparation on both learners and administrators to which make the most successful in eLearning. According to Saowapakpongchai and Prougestaporn (2012), there were several studies done previously mentioning about effective factors to create success eLearning education E.G. Soong, Chan, Chua and Loh (2001); Graf and Caines (2001); Oliver (2001); Govindasamy (2005); and Vate-U-Lan (2008).

However even though online education is continuously grown along the growth of internet using, people with disability still face difficulty to access internet resources including learning source due to badly design of the websites and lack of understanding among the web designers. According to Lilly (2001) The Internet and World Wide Web (Web) provide instant access to vast quantities of information. Unfortunately, many people with visual, hearing, mobility, or learning disabilities are unable to take advantage of the opportunities afforded by the Web. This is because badly designed and/or inaccessible Web sites prevent them from fully experiencing the graphical and aural benefits of the medium.

Therefore, all eLearning websites are required to rely on the issue of accessibility so that it would match to the theme of eLearning itself as everyone could study including people with disability. However according to Saowapakpongchai and Prougestaporn (2012), to create web accessibility, there were several components required to operate interdependently.

As a result, the aims of this paper were to present the factors to create effective eLearning for education in ASEAN community, and the web accessibility components to support equal access of disability students in ASEAN on ELearning education.

This paper would be divided into three main parts: First, the definition of ELearning, definition of people with disability, and background of ASEAN Community. Second, the factors to create effective eLearning for education in ASEAN. And third, the web

accessibility components to support equal access of disability students in ASEAN on ELearning education.

### **What Is Elearning**

ELearning is the transforming learning delivery where allowing to the reach online source of information which is the solution for individual study and can reduce the pride and stimulate the common coalition (Sloan-C, 2007).

### **People With Disability**

According to The Americans with Disabilities Act (1995), people with disability is a person who has a physical or mental impairment that substantially limits one or more major life activities; has a record of such an impairment; or a condition that impairs a major life activity such as walking, hearing, seeing, or working.

Meanwhile according to Disability and Equality Act. 2010 (2010), disabled person defined as someone with a physical or mental impairment which has a substantial and long-term adverse effect on his ability to carry out normal day-to-day activities.

### **Background Of Asean Community**

The Association of Southeast Asian Nations, or ASEAN, established on 8 August 1967 in Bangkok with the signing of the ASEAN declaration (Bangkok Declaration). The five Founding Fathers of ASEAN include Indonesia, Malaysia, Philippines, Singapore and Thailand. Brunei Darussalam joined on 1984, followed by Vietnam in 1995, Lao PDR and Myanmar in 1997, and Cambodia in 1999 (ASEAN, 2013).

In year 1997, Leaders agreed in The Asean Summit in Kuala Lumpur that To transform ASEAN into a stable, prosperous, and highly competitive region with equitable economic Development, To reduced poverty and socio-economic disparities (ASEAN Vision 2020), and To make Asean to be Asean community. That agreement was the establishment of ASEAN Community which will be effective from year 2015 onward (ASEAN, 2013).

### **Factors To Create Effective Elearning Education For Asean**

It is widely mentioned that eLearning occurs in a wide range of teaching activities where technology of one form or another is involved.

Papp (2000), eLearning factors included intellectual property, suitability of the course for eLearning environment, building the eLearning course, eLearning course content, eLearning course maintenance, eLearning platform and the measuring success of eLearning courses.

In addition, an empirical study among college students suggested that a framework for the Critical success factors in online education focused on three aspects in eLearning includes technology, instructor and the previous use of the technology from a student's/perspective of students' previous computer knowledge (Volery, 2000).

Furthermore according to Soong, Chan, Chua and Loh (2001); Graf and Caines (2001); Oliver (2001); Govindasamy (2005); and Vate-U-Lan (2008), it could be summarized the factors to create effective eLearning for education into four main factors include human deliberation factor, instructional design factor, technology

development factor, and social delivery factor.

#### *Deliberation of human*

In general, the term “human deliberation” combined by 2 words which were “Human” and “Deliberation”. The term Deliberation itself referred as a process in which members of a community talk together about a common problem by considering different experiences and weighing the costs and benefits of various options for action in an effort to identify common ground (Partners of the Americas, 2005). So, Human deliberation could be considered as the process done by people which referred as people.

For eLearning model field, human deliberation therefore could be explained as the process done by belonging people in eLearning to participate in cost/benefit and various options of eLearning operation. According to Soong, Chan, Chua and Loh (2001), the key main factor effecting to create eLearning model for higher education was human factors in terms of technical competency of both instructor and student, eLearning mindset of both instructor and student, and level of collaboration between instructors and students. Meanwhile, Graf and Caines (2001) mentioned that one key factor was the student participation to study. Oliver (2001) said two out of four major issues confronting the successful adoption and sustained use of eLearning in Australian higher education were belonged to human deliberation includes teacher expertise in online teaching, and student readiness to move online. In addition, factors effected for successful eLearning implementation were institutional support, student support, and faculty support (Govindasamy, 2002).

Finally, Vate-U-Lan (2008), one of the factors in HITS model for success eLearning implementation was human factor.

#### *Design of Instruction*

Wikipedia (2009), Instructional Design could be defined as the practice of maximizing the effectiveness, efficiency and appeal of instruction and other learning experiences. The process covered to determine the current state and needs of the learner, to define the end goal of instruction, and to create some intervention to assist in the transition. Generally, the process informed by pedagogically or adult learning tested theories of learning and may take place in student-only, teacher-led or community-based settings (Wikipedia, 2009).

Graf and Caines (2001) proposed six items of content robustness as the criteria to measure success eLearning that belonged to instructional design which referred to the degree to which the course content is available online, how it is structured, the use of images and graphics, and the degree of interaction among students and with the lecturer and the type and quality of student assessment. In the meantime, instructional design was one factor to implement success eLearning according to Vate-U-Lan (2008). In addition Oliver (2001) one of the factors to support and sustain quality in eLearning programs illustrated was provision of content and learning resources and instructional designs. And Govindasamy (2002) the factors effected for successful eLearning implementation were course development, course structure, and evaluation and assessment. These could be classified as the factor of instructional design.

### *Development of technology*

Technological development was the process of research and development of technology, which were expected to become generally applied in the near future (Haller, 1996).

Soong, Chan, Chua and Loh (2001) stated that one factor effecting success eLearning was perceived information technology infrastructure provided to teachers and learners. While, one of the key success factor to create sustained use of eLearning in Australian higher education was the factor regarding to technology infrastructure (Oliver, 2001). Then, in HITS model of success eLearning implementation, technology was another factor proposed to implement success eLearning (Vate-U-Lan, 2008). Finally Graf and Caines (2001), one of the effective factors to create success eLearning was technology used for encouraging degree of interaction among students and lecturer, and student participation to study.

### *Delivery of social*

The term social delivery generally referred as the output contributed by social to specific case, so it should be defined in terms of productivity, maintenance, and development of social toward specific case or idea (Holland, 1974). This could be implied in eLearning as the contribution to create success eLearning for higher education from social factor.

According to Graf and Caines (2001), there were some items in 10 items of academic rigor and 6 items of content robustness proposed for measuring success of eLearning that belonged to social delivery, such items as student participation, course content, course structure, , and answering resource. Oliver (2001), one of factor that belonged to social delivery which leads to sustain adoption of online learning for higher education in Australia was provision of content and learning resources given to students. Then, Govindasamy (2002), some factors effected for successful eLearning implementation belonged to social delivery as well, includes course development, and course structure. Finally, Vate-U-Lan (2008) proposed HITS model and classified social as one of the factor in terms of financial support, cultural support, learning content and language support for creating success eLearning.

From all 4 mentioning factors, in order to create effective eLearning education, those 4 factors were required to simultaneously implement and process together. According to Soong, Chan, Chua and Loh (2001) recommended to implement success eLearning, all factors identified either human or technology must be worked together.

### **Web Accessibility Components For Disability Students On Elearning**

According to W3C (2005), it was essential that several different components of Web development and interaction worked together in order for the Web to be accessible to people with disabilities, and four main components includes content which is the information in a Web page or Web application including natural information such as text; images; and sounds, and code or markup that defines structure; presentation; and etc, web browsers including media players; and other user agents, assistive technology including screen readers; alternative keyboards; switches; scanning software; and etc, and authoring tools which is software that created Websites.

W3C (2005), Those components were required to operate interdependently, as Web developers usually use authoring tools to create Web content, and people who is the users use Web browsers; media players; assistive technologies; or other user agents to get and interact with the content. There were significant interdependencies between the components as the components must work together in order for the Web to be accessible (W3C, 2005).

#### *Web content*

Web content generally defined as the textual; visual or aural content that was encountered as part of the user experience on websites, and also might be included other things such as text; images; sounds; videos; and animations (Abdelzaher and Bhatti, 1999).

According to W3C (2006), the WCAG was the document explains how to make Web content accessible to people with disabilities. And there were two proposed versions of WCAG.

The first version was WCAG 1.0 published in 1999 containing 14 guidelines, and the second version was updated and modified version based on WCAG 1.0 developed since year 2003 and completely finished (W3C, 2006).

According to W3C (2005), WCAG 1.0 consists of 14 main guidelines include Guideline 1: Provide equivalent alternatives to auditory and visual content. Guideline 2: Don't rely on color alone. Guideline 3: Use markup and style sheets and do so properly. Guideline 4: Clarify natural language usage. Guideline 5: Create tables that transform gracefully. Guideline 6: Ensure that pages featuring new technologies transform gracefully. Guideline 7: Ensure user control of time-sensitive content changes. Guideline 8: Ensure direct accessibility of embedded user interfaces. Guideline 9: Design for device-independence. Guideline 10: Use interim solutions. Guideline 11: Rely on W3C technology and guidelines. Guideline 12: Provide context and orientation information. Guideline 13. Provide clear navigation mechanisms. And, Guideline 14: Ensure that documents are clear and simple.

Meanwhile, WCAG 2.0 is divided into 4 main principles with 12 guidelines as:

Principle 1: Perceivable. Guideline 1.1: Text Alternatives. Guideline 1.2: Time-based Media. Guideline 1.3: Adaptable. Guideline 1.4: Distinguishable

Principle 2: Operable. Guideline 2.1: Keyboard Accessible. Guideline 2.2: Enough Time.

Guideline 2.3: Seizures. Guideline 2.4: Navigable

Principle 3: Understandable. Guideline 3.1: Readable. Guideline 3.2: Predictable.

Guideline 3.3: Input Assistance

Principle 4: Robust. Guideline 4.1: Compatible.

According to W3C (2006), both versions of WCAG were developed under the same objective that to assist web designers to create accessibility websites to all disability users without interrupting ordinary users to face difficulty to use the same website, however the WCAG 2.0 was the modification version after receiving feedback for WCAG 1.0.

### *Web browsers*

Web Browser defined as any software that gave a user access to website; and often provide a graphical interface that let users click buttons; icons; and menu options to view and navigate Web pages (Dzbor et al. 2003).

However, according to W3C (2006), the component of web browser was mainly related to user agents including media players; and other 'user agents as well, because web browser has been belonged to users. And, the term user agent was used in two ways includes the software and documentation components that together conform to the requirement to use, and any software that retrieved and renders Web content for user including Web browsers; browser extensions; media players; plug-ins; and other programs that help in retrieving and rendering Web content (W3C, 2006).

According to W3C (2006), User Agent Accessibility Guidelines or UAAG was part of a series of accessibility guidelines published by W3C beside WCAG and ATAG.

The UAAG guideline documents has explained how to make user agents accessible to people with disabilities including visually-impaired users and particularly to increase accessibility to Web content, due to user agents include of web browser together with media players and assistive technology which were software that some people with disabilities use in interacting with computers (W3C, 2006).

Based on UAAG 2.0 which is considered as the latest version of UAAG, the guidelines are as following: to follow applicable specifications and conventions, to facilitate access by assistive technologies, to ensure that the user interface is perceivable, to ensure that the user interface is operable, and to ensure that the user interface is understandable.

### 6.3 Assistive technology

Cook and Hussey (2001), Assistive technology is a generic term that includes assistive, adaptive, and rehabilitative devices and the process used in selecting, locating, and using them to support greater independence for people with disabilities by enabling them to perform tasks that they were formerly unable to accomplish or had great difficulty accomplishing by providing enhancements to or changed methods of interacting with the technology needed to accomplish such tasks.

According to W3C (2005), assistive technology including screen readers; alternative keyboards; switches; and scanning software was the key to support accessing website by disability people.

With this concern, W3C therefore has mentioned about how to use assistive technology to support full accessibility through website, but W3C however did not set up specific guideline like WCAG; ATAG; OR UAAG to apply with assistive technology component, but UAAG was allowed to apply for using with assistive technology.

### 6.4 Authoring tools

W3C (2006) defined the term authoring tool as any software or collection of software components that authors could use to create or modify Web content for use by other people.

According to Harrison (2002), when recommended design strategies for the website were implemented which would be supported websites especially eLearning website to be fully accessed by every people including visually-impaired people; any Web-based learning program could potentially be made accessible to students with visual impairment; as assistive technologies like Screen readers or Braille displays could provide audio access for students who are blind and also alternative pointing devices; onscreen keyboards and voice recognition; and other adaptive technologies offered a choice of input and output methods, but however, one of the greatest barriers to access was the lack of authoring tools that support web developers which in line with existing accessibility guidelines.

As a result, W3C had developed the particular guideline to guide the developers to develop and use accessible software supporting to create accessible web content so called Authoring tools accessibility guidelines [ATAG].

In general, the ATAG has provided guidance for developers of software which created content for the web or in a web-based markup language, and the purpose of the Guidelines were to assist developers in designing authoring tools that generate accessible web content and to assist developers in creating an accessible authoring interface (W3C, 2006),.

Based on the ATAG 2.0 which is considered as the new latest version and developed from ATAG 1.0, the guidelines includes authoring tool must facilitate access by assistive technologies, authoring tool user interface must be perceivable, authoring tool user interface must be operable, authoring tool user interface must be understandable, production of accessible content must be enabled, authors must be supported in the production of accessible content, and accessibility solutions must be promoted and integrated.

### **Evaluation Criterias**

It is required to evaluate both the theme of effective eLearning education served and the theme of effective for accessibility of disability students.

For evaluation of effective on eLearning education served, according to Hammer and Champy (2003), there were four major criteria applied to evaluate the performance of any operation includes cost efficiency, quality, service, and speed. These criteria could be applied to evaluate the eLearning provided on higher education:

#### *Cost Efficiency*

One important part of the eLearning value is the sum of an ability to save money and how much do the benefit generate to the business (enhance skill and knowledge, improve job performance, and impact results). It is called cost efficiency.

#### *Quality*

According to Kirkpatrick (1998), there were four levels of quality includes reaction, learning, performance, and results. Reaction was the typical end-of-course evaluation or rating sheet, while Learning was the evaluation simply as tracking strategy, and Performance was the determination of the effectiveness in the eLearning system to ask eLearners who went through the online learning, finally results were often couched in a demand to prove that eLearning works and works better than others (Kirkpatrick, 1998).



### *Service*

Another important criterion area for eLearning is service, in terms of easy accessibility and the quality of access.

### *Speed*

The last of the four criteria is speed. There are three major considerations: First, how quickly eLearning initiative be up and running (the development question). Second, how quickly can the eLearning initiative reach everyone who needs the content (the delivery question). And third, how fast can the eLearning initiative be altered due to a change in the business or the need to distribute new or revised information. For evaluation of effective on the accessibility of disability students, once the eLearning model proposed on website to provide higher education mode of studying, the website is required to submit to The National electronic and Computer Technology center (NECTEC) to verify the quality of accessibility. The quality was measured and given through three level: A = acceptable with minor improve, AA = good with minor improve, and AAA = excellence for accessibility.

### **Conclusion**

This paper found that to create effective eLearning for education in ASEAN, four necessary factors required to rely include deliberation of human, design of instruction, development of technology, and delivery of social. And in order to ensure that the eLearning websites could support the accessibility of students with disability, it should be developed based on the guideline proposed to create web content, web browsers, assistive technology, and authoring tools. Finally, the evaluation criterias could be applied to evaluate the effective of eLearning websites for education among ASEAN community were cost efficiency, quality, service, and speed.

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