Research-based guidelines for evaluating educational service website: case study of Thailand cyber university project

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Abstract

The research aims to develop User Interface (UI) guidelines and a prototype for evaluating an educational service website. Thailand Cyber University Project (TCU) under Office of the Higher Education Commission, Thailand was used as a resource of detailed examination in this research. The guidelines development based on quantitative and qualitative data collected from the 3 data sources (n=139,482, n=7,147, and n=188,428 respectively) during the last 3 years. After the data were analyzed; the guidelines were developed; the prototype was tested by 107 users; and they were approved by the experts. Both the guidelines and the prototype were focused on 3 perspectives: technology, pedagogy, and accessibility, as detailed in the article.

Keywords: Research-Based Guidelines; Educational Service Website; Thailand Cyber University Project

Introduction

The article on ‘Research-Based Guidelines for Evaluating Educational Service Website: Case Study of Thailand Cyber University Project’ presents the results of the research, focusing on the research process and the research results which readers can apply as guidelines in evaluating educational service website in different context. This includes evaluation process, evaluation guidelines, evaluation framework, and evaluation results. The article contains (1) Summary of research objectives and research methods, (2) Research results, (3) Discussion of the research results, and (4) Suggestions.

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1. Summary of research objectives and research methods

The research aims to (1) study the use of TCU website from quantitative and qualitative data collected by TCU, (2) study website structure, user interface design, and conduct usability test of TCU website, (3) present a model of suitable website for TCU service, and (4) design and develop a prototype of TCU website from the proposed website model. Also, it presents recommendations and suggestions to develop the website suitable for TCU service. The research process consists of 4 phases including:

**Phase 1: Study the use of TCU website.** The data were collected from a system analyzing the statistics of the use of TCU website from 3 sources (1) data of link clicking on TCU website, (2) data of satisfaction survey of TCU website users, and (3) the overall statistics of the website. The report presented quantitative and qualitative data, classified by the variable features of users, satisfaction level, and other related context from the sample group of 139,482, 7,147, and 188,428 respectively.

**Phase 2: Study website structure, user interface design, and conduct usability test of TCU website.** The research was conducted using evaluating framework for educational service website in two main areas: (1) technology area, including user interface design, navigation design, accessibility from various devices such as computers, notebooks, tablets, and smart phones, and (2) pedagogy area including primary information sources, supporting information sources, quality of the design contributing to education, reliability, and preparation for the ASEAN Community in 2015.

**Phase 3: Present a model of suitable website for TCU service, using data from Phase 1 and Phase 2 includes:** (1) the results of the study of the use of TCU website; (2) the results of the study of website structure, user interface design, and usability test of TCU website, based on two research conducted in 2010 and 2013 which the author was a principal researcher. The research includes “Proposed Models of Appropriate Website and Courseware for E-Learning in Higher Education: Research Based Design Models” and “Analysis of the Cultural Factors Affecting the Proper Design of Website and Electronic Courseware for e-Learning in ASEAN”; (3) literature review including research, articles, and samples of domestic and international sites; (4) interviews with experts; and (5) analysis and synthesis of data obtained from step 1-4 to find a suitable educational service website.

**Phase 4: Design and develop a prototype of TCU website from the proposed website model.** Make recommendations to develop the site that is suitable for TCU service by: (1) designing and developing a prototype of the TCU website; (2) conducting satisfaction and feedback survey of users; (3) having the prototype approved by the experts; and (4) redesigning the prototype using the results from steps 2-3.

2. Research results

Research results included 4 phases of the research including:

**Research Phase 1: The result of the study of the use of TCU website**

The study of the use of website collected the data from a system analyzing the statistics of the use of TCU website. The data consisted of quantitative and qualitative data, classified by the variable features of the users, satisfaction level, and other related context. The data was collected from 3 sources and can be analyzed as followed.

**Data source 1:** Data of link clicking on TCU website (n=139,482). Data, which was collected during January 2010 to December 2013, found that there was access to internal links and external links which can be classified into 7 groups: (1) education, religion, and culture, (2) science and technology, (3) economy and social, (4) language, (5) health, (6) energy, and (7) information published by TCU.

Regarding the top 10 links which had the most visitors, there were both internal links and external links. Popular internal links were TCU Open Educational Resources, TCU E-Books, and TCU Open Courseware. Popular external links included websites offering information about science and technology and language.

**Data source 2:** Data of satisfaction survey of the TCU website users (n=7,147). The objective of the survey was to compare the differences of user satisfaction in 2011, 2012, and 2013. The data was classified by gender, educational level, occupation, and access to services. The results showed that most users were female, younger than 21-30 years old, with educational level of bachelor’s degree and occupation of students, followed by government officers / employees. Most users accessed the lessons in the TCU-LMS with the internet from educational institutes. Overall results found that users had satisfaction at high level and there was no significant difference in terms of gender (male), age (age group 21-30 years, 31-40 years, 41-60 years, and over 60 years), educational level (high school, vocational education, master degree, doctoral degree), occupation (state enterprises...
and private enterprises), and access to services (3G, educational institutes, Internet Café, and modem) that affected the user satisfaction of TCU website. Considering each item, it was found that users satisfied with stability of TCU-LMS, the publication of information on TCU website, the easiness in using TCU-LMS with minimal guidance or none at all.

**Data source 3:** The overall statistics of TCU website (n=188,428). Data was collected during January to December 2013. The results were divided into 4 quarters, including Q1 (Jan-Mar 13), Q2 (Apr-Jun 13), Q3 (Jul-Sept 13), and Q4 (Oct-Dec 13). The results were as follows; Hour Distribution, it was found that most visitors visited the website during 10:00 am - 16:59 pm, most visited on weekdays (Monday-Friday); Browsers, it was found that, in every quarter, TCU website visitors used Internet Explorer, followed by Safari; Reference, it was found that, in every quarter, most visitors visit TCU website from google.co.th.

**Research phase 2:** The results of the study of website structure, user interface design, and usability test of TCU website

The results of this phase will be presented into 2 parts: (1) the results of the study of site structure and user interface design of TCU website, and (2) the result of the study of the structure of TCU website according to two researches conducted in 2010 and 2013.

**Part 1:** The report on the study of site structure and user interface design of TCU website consists of 3 parts. The first part is site structure. It was found that there were 3 types of link: 1) internal site, 2) external site, and 3) external site maintained by TCU. The second part is menu bar. It was found that TCU website consisted of 6-leveled menu. Considering the link to internal sites, external sites, and external sites maintained by TCU of the 6-leveled menu, it was found that there was a lack of consistency in the structure of the menu bar. The third part is page design. It can be grouped into 5 types. Every type has main components which were page header and page body. However, navigation menu was not consistent; sometimes it appeared on the left, sometimes on the right, or both. It can be concluded that the site still lacked of consistency in the choice of a model based on the type of link and content (site structure are shown in Picture 1-3).

**Part 2:** The report on the study of the structure of TCU website, according to the research conducted in 2010 and 2013 by the authors as a main researcher: (1) Research on “Proposed Models of Appropriate Website and Courseware for E-Learning in Higher Education: Research Based Design Models”, and (2) Research on “Analysis of the Cultural Factors Affecting the Proper Design of Website and Electronic Courseware for e-Learning in ASEAN”. The areas of evaluation consisted of 3 areas (1) Technology, including 1) user interface design, 2) navigation system design, 3) access to data, and 4) the compatibility of tools; (2) Pedagogy, including 1) primary information sources, 2) supporting information sources, 3) the quality of the design contributing to education, 4) reliability, and 5) preparation to the ASEAN Community in 2015; and (3) Accessibility, using "Thai Web Content Accessibility Guidelines" (TWCAG) which evaluated the ability of the website that can be perceivable, operable, understandable, and robust.

The results of TCU website evaluation, considering the click of TCU website in order of Top 10, the first is the link to a PDF file which cannot be included in the analysis. In the evaluation of other 9 websites, the 3 areas to be evaluated included 1) Technology, 2) Pedagogy, and 3) Accessibility (TWCAG 2010).

**Analysis by the evaluation form of the site components on technology** found that the 9 websites had the first 3 user interface design components. They consisted of the clear identified name, quick access to information, and the easiness and convenience in controlling the using, respectively. For the components of navigation design, all sites had the top 3 components, including a link back to the main page, having a content overview, and using symbols that were easy to understand and convey meaning, respectively. For the accessibility components, all sites used and had the clear classification of content. For the components on the compatibility, the top 3 components that all sites shared were that they offered mobile Learning, were accessible via the tablet, and can be read on portable devices; both vertical and horizontal with text didn’t exceed the screen when reading vertically.

**Analysis by the evaluation form of the site components on pedagogy** found that all sites had 3 components of primary information sources, including short and concise content, the division of content, and the classification of content into categories, respectively. For the components of supporting information sources, the top 2 components that all sites had were promotional tools for an online community and tools that helped in sharing information. Three components on the quality design that all sites had included short, concise, and update content, accurate and non-biased data, and complete information. For the components on the reliability of the site, the top
component that the sites shared was that site creator and contact e-mail was published on the sites. For the last component on the preparation for the ASEAN Community, there was a single component that only 2 sites had which were content about the local culture of countries in ASEAN.

The evaluation of the site components on accessibility according to TWCAG 2010 found that the components on perceivable, the 2 components that the sites had were the providing of alternate text for time-based media, followed by the presenting of the content that users can see or hear clearly, as well as the distinguish of the foreground and background colors. For the components on operable, the top 3 components that the sites had included the use of only keyboard to access all parts and use web pages, offering sufficient time to allow users to read and use content, and not creating content that caused seizure. For the components on understandable, the top 3 components that the sites had included the web pages appeared and operated in a predictable manner, users can read and understand the content in the text form, and the site helped users to avoid mistakes and suggest a solution. For the last component, robust, it was found that most sites (6 sites) had the ability to accommodate a wide variety of web technologies both now and in the future.

Research phase 3: Presenting a model of suitable website for the TCU service.

The report was divided into 3 parts (1) the presenting of a suitable site model (2) the results of expert interviews, and (3) the analysis of data from 1-2 to find a model of suitable website.

1) Presenting a model of suitable website for TCU service using data from the research phase 1-2.

The literature review included research and articles related to the definition of educational websites, including the definition, types, guidelines for evaluating educational website, and samples of websites from both domestic sites and international sites. Also, information from research phase 1 and phase 2 was used as guidelines for evaluating educational websites and for designing and developing a prototype in the next phase.

2) The results of interviews with 10 experts on the design and development of educational service websites. Case studies: evaluation of the operation of TCU website.

The results of the expert interviews could be summarized into 3 main areas that the reader can use as guidelines to design and evaluate websites.

1. Technology: (1.1) Navigation system design should focus on site map, add search box in a position easily seen. The design should accommodate users with different preference such as the design for people who like to search and the design for people who like to click, which should add social media icons to allow users to share their learning with each other. Icons should be consistent and harmonious in the whole site. Each module should be placed in the order of importance of the content. (1.2) Accessibility. Information display should not exceed one page and a half. Website should be in two languages. (1.3) The compatibility of tools. The website should be designed to accommodate the access by portable devices (Mobile site).

2. Pedagogy: (2.1) Primary information sources should separate internal information sources and external information sources clearly. MOU should be done to share course contents. Information should be updated and there should be an announcement about online courses. Organization image should be more emphasized by presenting the vision and mission. Tag Cloud may be used to present organization image. (2.2) Supporting information sources should add social media icons to allow users to share their learning with each other. (2.3) The design quality. Color tone of each module should be harmonious and well blended. Log-In area for should be placed in a position clearly seen (top left of the website). (2.4) The preparation for the ASEAN Community. There should be cooperation in ASEAN. News about ASEAN or courses related to ASEAN should be added. The website should be in 2 languages to support the ASEAN Community. Additional feature to translate languages of web browsers might also be used.

3. Accessibility: (3.1) The website should be developed to be user friendly site which users can use easily without the need to learn. (3.2) The difficulty to access information. The website should be improved to enable easier access to information. Content structure should be redesigned to suit the user. (3.3) Information should be grouped according to the scope of TCU contents or the frequency and interest of TCU users. (3.4) The website should be designed to accommodate the access by portable devices (Mobile site). (3.5) Registration system should be improved by providing access without registration (Open Access). Single Sign-On system which allows users to access the services of the entire system with a single authentication should be used. In the first phase, it could offer to a small group of users and gradually develop further in the future. (3.6) User statistics. Tools that can show information of domestic sites may be used such as True Hits. (3.7) Search Box should be in a position easily seen
and has a format compatible for users with different preference; people who like searching and people who like clicking.

3) **Analysis of data obtained from step 1-2 to find a model of suitable educational service website.**

The analysis and synthesis of data from step 1-2 can obtain a model of suitable website (Page Design and Site Structure) and then data was used to develop a prototype for educational service website. This will be presented in comparison along with the research phase 4.

**Research phase 4: The result of the designing and developing a prototype of TCU website from the proposed website model. Presenting recommendations and suggestions to develop the website that is suitable for TCU service.**

Research phase 4 will be presented in 4 parts: (1) Presenting a prototype of a redesigned educational service website; (2) Reporting the results for the satisfaction and feedback survey of the user of the TCU prototype website; (3) Reporting the results of the approving of the TCU website prototype by 5 experts, and (4) Reporting the redesigning of the prototype of TCU website from the results of part 2-3, including the feedback from users and experts.

1. Based on the analysis and synthesis data obtained from the report 1-4, a suitable site structure and page design can be created and then developed into a prototype of educational service website. Comparison detail will be presented in phase 4.

2. The report of satisfaction and feedback survey of 107 users of TCU prototype website. The report was done in qualitative and quantitative data analysis. It was divided into Part 1: Basic information the respondents and Part 2: Satisfaction of TCU website users in five areas: (1) web technology, (2) content design, (3) multimedia design, (4) interaction, and (5) identity and creativity.

**Part 1:** The survey of basic information of the respondents. It was found that most respondents were female (61.68 percent), aged 31-40 years (44.86 percent), educational level: master degree (42.06 percent), occupation: student (29.95 percent), experience in using the computer: 11-15 years (43.93 percent), having a computer or electronic device connecting to the Internet (98.13 percent), using a portable computer (notebook) to visit TCU website (36.03 percent), and having experience of using websites offering TCU service (45.79 percent).

**Part 2:** The survey of the satisfaction of users of TCU website. It was found that users had satisfaction at a high level ($\bar{x}= 4.17$, $S.D. = .62$). Considering each area, it was found that the highest area was identity and creativity ($\bar{x}=4.29$, $S.D.=.76$), followed by content design content ($\bar{x}=4.24$, $S.D.=.60$), and interaction ($\bar{x}=4.21$, $S.D.=.70$), respectively.

3. The report of the approving of the prototype of TCU website from 5 experts. It was found that the experts had satisfaction at a high level ($\bar{x}= 4.21$, $S.D. = .63$). Considering each area, it was found that the highest area was web technology ($\bar{x}=4.35$, $S.D. = .51$), followed by interaction ($\bar{x}=4.25$, $S.D. = .62$), and content design ($\bar{x}=4.21$, $S.D. = .68$), respectively. Examples of suggestions included: (1) A banner which can convey the meaning of the organization, without interpretation, should be used, (2) a screen design should be designed with elements and contents that attracted the attention of the general web audience and web members, and (3) there should be instructions showing in the first page and can be seen easily.

4. The report of the redesigning of the TCU website prototype based on the results of parts 2-3. The redesigning of the website developed by Content Management System: CMS can be summarized into 2 parts: the graphics and the system. The graphics have been redesigned based on the feedback, in both Homepage of TCU OOC and TCU GLOBE. The system has been modified in 10 parts which were in accordance with the suggestion in the research phase 1-3.

From the research phase 1-3, the author will introduce a website model and prototype that is suitable for TCU service. The presentation will be a comparison of 3 models: (1) the site structure and prototype before redesigning which was the result of the research phase 1; (2) Redesign 1 which was the result of the research phase 2; (3) Redesign 2 which was the result of the research phase 3. Examples are as follows.

1. Comparison of site structure before redesign, after Redesign 1 and Redesign 2, as shown in Figures 1-3.

2. Comparison of Homepage of the prototype before redesign, after Redesign 1 and Redesign 2, as shown in Figures 4-6.
Comparison of site structure before redesign, after Redesign 1 and Redesign 2.

Figure 1: Site structure before redesign

Figure 2: Site structure after redesign 1

Figure 3: Site structure after redesign 2

Comparison of Homepage of the prototype before redesign, after Redesign 1 and Redesign 2

Figure 4: Homepage before redesign

Figure 5: Homepage after redesign 1

Figure 6: Homepage after redesign 2
3. Discussion of the research results

Considering the relevance with other researches, it was found that there were many other researches that were relevant and consistent with this one. For example, TCU website can be classified as many types of website considering its content and services. According to the concept of Anantakal (2005), they are (1) Information site which has the main objective to introduce organization, activities, and progress report; (2) Portal site with a variety of contents that does not specific on any subject. It offers both internal links and external links for the target audience; (3) Branded Promote site which aims to promote a specific issue such as new curriculum or course developed by TCU and annual national and international conferences; (4) Personal & Community site which users study in TCU programs or courses such as E-Learning Professional in a virtual classroom, specifically created for a group of people with specific interests; and (5) Educational site because overall TCU website has a clear purpose to disseminate knowledge, education, teaching, research in the organizational level.

When considering the type of educational site, it can be said that the distinctive feature of the technology of TCU website is Portal site. It consists of a search engine that compiled links of interesting websites as well as services related to the mission. In addition, the portal site is a place for people to share and discuss their opinions in various issues, which are called community web. It is a web hosting provider for a group of people who are interested in the same subject to exchange and comment with each other (Ping and Gisela, 2000; Sukekyu et al., 2003).

This is also consistent with the concept of Khlaisang (2010) discussing about a suitable website for e-Learning in higher education. It was concluded that there were 16 issues about the model of educational service website that the developer can use to design and develop website. This included technology, pedagogy, and accessibility. It is also consistent with the findings of the research on “Research on Analysis of the Cultural Factors Affecting the Proper Design of Website and Electronic Courseware for e-Learning in ASEAN” (Khlaisang, 2012). The research aimed to conduct Exploratory Factor Analysis: EFA on the culture and proposed a website and courseware model suitable for e-Learning in ASEAN. It was found that cultural components that affected website suitable for e-Learning in ASEAN consisted of 9 elements, 56 variables, divided into 6 direct elements and 21 variables and 3 indirect components, 35 variables, including technology, pedagogy, and accessibility. Thus for, the 2 researches can be additional sources of information in the process of designing, developing, and evaluating the quality of educational service website.

This is in line with the concept of Ping and Gisela (2000) which noted that in evaluating educational website, there were 2 issues to be taken into account: (1) the satisfaction of the user; the customer must be satisfied with the website appearance, including the design, the benefits gained, the use of graphics and (2) easy and uncomplicated access to information; users can access information and can go back to main page easily. This is in accordance with the guidelines for the development of the prototype website which focused on the design of user interface and adding social media to meet the interest of the target user. The design of a navigation system to provide a simple access to information, providing 2 languages, and the compatibility of the tool which focused the access by mobile devices were the issues to be in consideration.

Considering the type of educational service website, it can be said that the distinctive feature of education in TCU website is the content. According to World Best Website Awards (2004), the organizer defined evaluation and scoring criteria. The component of content has a weight of 30 %. The criteria consisted of Purpose: (1) having the clear mission and goals, (2) the benefits and quality of content, (3) providing resources free of charge; (4) having a reason to return to visit, Interaction: (1) having interaction with users, (2) providing the privileges to members, (3) providing a list of e-mail, newsletters, news groups, (4) providing other useful services for users, and Information: (1) making complicated information easier to understand and summarizing the essence, (2) the structure of information and basic objectives are short and concise. Providing FAQ, (3) attracting interest and having a clear working system, and (4) access to information, content evaluation system, searching system, site map, steps to goal, the ability to read, effective graphics.

They are consistent with the concept of the American Association of Webmasters (2007). The organizer of AAWM Awards defined evaluation and scoring criteria based on the components, including the content which considered the following issues (1) clearly stated purpose, (2) title on each page, (3) naming titles and having persuasive message inviting viewers; (4) writing style, clear language; (5) contact information; (6) Policy and Terms of Use; (7) Copyright; (8) grammar and spelling; (9) a statement on user’s privacy and confidentiality; and (10) content suitable for all genders and ages.
4. Suggestions

Suggestions of each research phase can be described as followed.

Research phase 1: The results of the study of the use of TCU website can be used as basic information to design and develop a website to meet the needs of the target users and the objectives of the organization. Also, it can be guidelines for the study and analysis of the needs in other research.

Research phase 2: The results of the website structure, user interface design, and analysis of the suitability of the website for the use of TCU will be important information to analyse the suitability of the site by using guidelines to design and develop a website on international standards. Also, it can be guidelines for the designing and developing of educational in other research study.

Research phase 3: The results of the presentation of a model of suitable website for TCU service will be important information in developing suitable educational service website. The research employed data from the literature review, expert interviews, and feedback from the user. The results of this research will be useful for other research such as evaluation questionnaires of suitable educational website which were developed from literature review and the samples of 40 websites to get the questions that covered all aspects of the evaluation.

Research Phase 4: The results of the designing and developing a prototype of TCU website from the proposed website model and the presentation of recommendations and suggestions to develop the website that is suitable for TCU service. It will be important information to develop suitable educational service website. The researcher presented the prototype (Mock up) design and development methods of the 3 main pages with an emphasis on the use of Open Source Software which are internationally used and popular among of the website developers. So the website has international standards and can be delivered for future maintenance. The results of this research will be useful for other research in the part of the suggestions from experts who are professional in the designing and developing educational website.

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