

RMIT UNIVERSITY

**SCHOOL OF GLOBAL STUDIES, SOCIAL SCIENCE
AND PLANNING**

**INTERNET-BASED SURVEY DESIGN FOR
UNIVERSITY WEB SITES:
A CASE STUDY OF A THAI UNIVERSITY**

by

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This thesis is presented in partial fulfilment for the degree of

DOCTOR OF EDUCATION

JANUARY 2007

DECLARATION

This thesis contains no material which has been accepted for the award of any other degree or diploma in any university. To the best of my knowledge and belief this thesis contains no material previously published by other person except where due acknowledgement has been made.

Signature: *Poonsri⁷ Vate-U-Lang*

Date: 12th January, 2007

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ABSTRACT

The use of on-line questionnaires has increased dramatically; however, there has been only very limited systematic research on web-based design in Thailand, including for Thai undergraduates who are the biggest group of Thai Internet users. This experiment investigated web-based survey design principles based on an English-language background trial at a Thai university. The findings of two types of web usability tests revealed that the scrolling web-based format was the most suitable for conducting surveys. Web-based surveys are most likely to attract higher response rates and more accurate results when endorsed and sponsored by a trusted organization, when instructions are short, simple, and specific, when closed and dichotomous questions provide sufficient answer options and when matrix and semantic differential questions are limited. Research also indicates that a font size of Ms Sans Serif as “-1” or 14 pixels in Thai is popular, as is a simple progression bar, three-point rating scales, and a decorated survey form. The approximate ideal length of an effective on-line survey is about 20 questions and should take between five to ten minutes to complete. The short and potentially sensitive demographic questions are best obtained before respondents complete the questionnaire. Willingness to answer private and personal information for users of Thai university web sites depended on familiarity and trust in organizations owning the survey. Thai undergraduates adequately understand check boxes, option buttons or radio buttons and drop-down menus and also preferred Internet technology to enhance the quality of web-based surveys; therefore, the help section may only be necessary when the survey is more complex than a general survey.

Research for this project was conducted over 22 days from 26th January to 16th February 2004 at the selected university web site. The survey samples self selected by clicking through to the online questionnaire. The rate of the survey completion was 22.7 per cent or 3,848 times. The characteristics of participants did not differ meaningfully from the actual university population; 68 per cent of participants were female and 32.8 per cent of participants were university students. The most effective invitation method was ‘a message box when users click on any link on the homepage’ since it is a new method with no restriction from the browser with an effective grasp on the attention of users rather than the advertising banner or the pop-up window. The

most significant reasons influencing participants' decisions about the questionnaire were the same factors effecting decisions to participate in surveys in future; these were the *topics of survey* followed by *the importance of the survey content*. The third reason influencing users' decision to participate in this survey was the invitation method. In the future, the third factor affecting users' decisions may become *the actual benefit accruing for respondents*.

ACKNOWLEDGEMENTS

It is a pleasure to thank the many people who have made this thesis possible. I would like to thank Professor Desmond Cahill, my Ed.D. supervisor. With his enthusiasm, his inspiration and his great efforts to explain things clearly and simply, he has helped to make this research study enjoyable for me. Throughout my thesis-writing period, he provided encouragement, sound advice, good teaching, good company, productive visits to Bangkok and lots of good ideas. I would have been lost without him.

Additionally, I would like to thank my second supervisor, Dr. Paul Battersby, who is fluent in both English and Thai and understands these two different cultures very well. I would like also to thank the many teachers at the Learning Skills Unit, RMIT, Judy Maxwell, Elizabeth McAspurn and Kate Gribble with their support on my academic writing style as appropriate for a doctoral thesis.

I would like to thank Saroch Maolanont, Director of the Thai university Computer Centre and his staff for their key efforts during the collecting of the data from the web-based survey. Without Saroch Maolanont and his assistants at the Computer Centre, I would not have had any data to analyse and from which to develop principles about web-based survey design for Thai university students. I would like to thank all respondents, who participated in this current study.

I would especially like to thank my family for their continued support as I have pursued my education and goals throughout the years. My mother, Lang Vate-U-Lan, provided consistent emotional support and served as my best editor. The many best friends, Susan Wright and her family, who were very supportive of my education when I was in Australia; she has always helped me in every way that I needed. Moreover, the many best friends from the post graduate room, especially Kelvin Tan Teck Loong and Nurgul Sawut, who were very helpful in our mutual discussions and were my confidants throughout. Lastly, I would like to thank Alan Montague, my best friend, for his academic advice which was very useful throughout the study.

Most importantly, I would like to express gratitude to my life partner and husband and my little daughter, for their support and encouragement throughout my

pursuit of this doctoral degree. My husband's unyielding belief in me has been a constant source of energy. His strength and love have continued to inspire me throughout this process, even from afar. I can not thank him enough for his constant love and support.

Poonsri Vate-U-Lan,

January 2007.

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“The rapid rise, and continued development, of the internet provides a unique opportunity for the psychological study of behaviour on a new medium that will hopefully inform the development of the Internet as a social technology”.

(Joinson, 2003a, p.199)

CHAPTER ONE

RATIONALE FOR STUDY

1.1. Introduction

The use of web-based surveys in social science and educational research has grown in line with the rising popularity of the internet (Solomon, 2001). After the pioneer on-line survey was first conducted via email in 1986, the use of on-line surveys for marketing and other research is also becoming more common (Lazar & Preece, 1999; Kiesler & Sproull, (1986) as cited in Andrews, Nonnecke, & Preece, (2001)). There is a distinct and general trend to replace paper-and-pencil surveys with Internet-based surveys (Couper, 2000; Gunn, 2002). Both the academic and business literature comparing web-based questionnaires and paper-based questionnaires confirms that differences in survey results from both methods are negligible (Andrews et al., 2001; Stewart & Yalonis, 2001). On-line questionnaires used in Western Europe and the United States of America accounted for about five per cent of all market research (Manfreda, Batagelj, & Vehovar, 2002).

According to '*the Honimichael 50*', a top research firm in US, the total funding for on-line research surveys was seven per cent of the total funding for all surveys in 2000 (Stewart & Yalonis, 2001). Moreover, Manfreda, Batagelj and Vahovar (2002) predicted that the use of e-surveys would continue to rise to about eight per cent in 2001. The same document further predicted that by 2004, the percentage of on-line questionnaire use would reach 50 per cent. Furthermore, the use of Internet-based surveys in both large-scale ($n > 2000$) and small-scale ($n < 2000$) samples in America has been increasing rapidly (Hollenbeck, 2003). One possible reason is that the younger generation of Internet users in both developed and developing countries seems to prefer the new technology (Carini, Hayek, Kuh, & Ouimet, 2003; Pandi, 2002).

In the near future, Internet-based surveys will become ubiquitous tools for collecting data, both for marketing and academic research. Email surveys may become the standard tool for gathering data in the 21st century (Schuldt & Totten, 1994). As a developing country, Thailand is following the trends evident in the western world. Several studies, such as those by Alvarez and Van Beselaere (2003) and Bosnjak and

Tuten (2001), indicate that, even though web-based surveys are not a new research instrument, the administration of web-based surveys which has its own unique features still requires study. Internet-based surveys need to be analysed and studied for implementation and design purposes (Andrews et al., 2001; Schonlau, D. Ronald, & Elliott, 2001).

In Thailand, however, the research literature to date indicates that there has been little systematic study of appropriate formats for on-line questionnaire design especially for an Asian context which does not use the Roman script and where its cultural and learning contexts differ very much from the West. In fact, across the world there is a clear dearth of research even though the commercial advantage is clear. Internet-based survey administrators need to try out different recruiting techniques and invitation methods, including those who do not use incentives (Deutskens, Ruyter, Wetzels, & Oosterveld, 2004). Moreover, the most effective means of inviting participation through the examination of responses to Internet-based surveys for Thai university students has not been investigated even though this type of data collection has become a more common tool for surveys within Thai universities. The existing research into web-based survey design contains a gap in the knowledge base, particularly about the Asian experience. This research study will fill that gap.

Therefore, this thesis explores the principles of web-based questionnaire design, adopting previously used methods, in a trial on a Thai university web site. The study sets out effective methods for encouraging participants of web-based surveys to participate in and complete the on-line questionnaire. The following sections outline key issues and justifications for this investigation into web-based survey design in Thailand, particularly in an academic context.

1.1.1. Benefits of Internet-based surveys

There are a number of benefits in using Internet-based surveys. The first major advantage of an on-line questionnaire is its cheaper investment cost (Alvarez, Sherman, & VanBeselaere, 2002; Bennekom, 2002; Frazee, Hardin, Brashears, Haygood, & Smith, 2002, 2003; Gunn, 2002; Manfreda & Vehovar, 2002a; Stewart & Yalonis, 2001; Wagner, 2003). When the research is conducted with a large scale sample, the cost of surveys on the Internet is lower than paper-based surveys sent via mail, or asking people on the telephone. This is because there is no cost for postage

stamps or phone usage fees (Shannon, Johnson, Searcy, & Alan, 2002; Wagner, 2003; ZDNet, 2001). In Australia, as part of a study on religion and social cohesion, Cahill and his colleagues used an on-line questionnaire to conduct a public electronic consultation with the Australian people after advertising in the major newspapers in each capital city (Cahill, Bouma, Dellal, & Leahy, 2004).

The second advantage of web-based questionnaires is that they present a quicker way of conducting surveys when the desired number of respondents is large (Alvarez et al., 2002; Frazee et al., 2002, 2003; Gunn, 2002; Manfreda & Vehovar, 2002a; Stewart & Yalonis, 2001; Wagner, 2003). Web-based surveys can reduce the duration of turnaround from three-to-four weeks down to hours or days (Bennekom, 2002). This is because collecting data in digital mode on the Internet enables a response to be recorded directly onto the server database files. Indeed, the Internet-based survey mode enables the respondents to complete the form at all times of the day and night. Time and response cycle of doing the Internet-based survey is very fast when compared with a postal survey (Yun & Trumbo, 2000; Swoboda, et al., (1997) as cited in (Andrews et al., 2001).

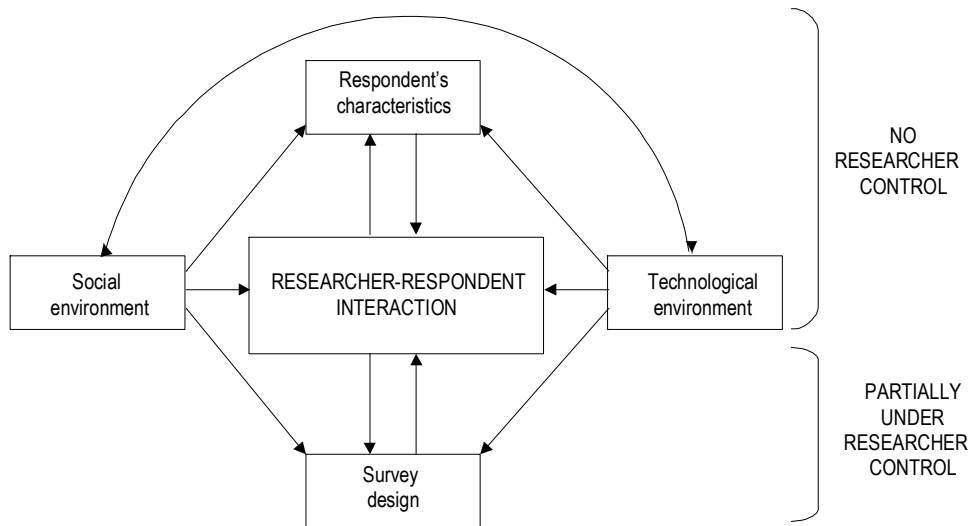
Moreover, another benefit in Internet-based surveys is that they may achieve higher response rates (Alvarez & VanBeselaere, 2003). One problem of traditional surveys is the growth in non-response rates (Alvarez et al., 2002). The standard response rate of mail surveys is approximately ten per cent (Belbey & Gedney, 2003). However, the same study reveals that the usual response rate of Internet-based surveys is as high as 50 per cent. Therefore, the result of this proposed study will be useful for future research that uses on-line questionnaires as a data collection tool.

1.1.2. The importance of design and interaction factors

Participation in web-based surveys is influenced by two main factors; one external to the project; the other internal. (Vehovar, Koren, & Manfreda, 2002) (see Figure 1.1.). The first, incorporating the social environment, technological environment and respondent characteristics, is beyond the researcher's control, whereas the second - Internet survey design - is more within the control of the researcher.

Figure 1.1.: Participation in web surveys

Source: Vehovar et al. (2002)



To conduct an on-line survey through a questionnaire, the researcher has to be aware of these externalities and should recognise that the second factor influences response rates. Two main factors highlight the importance of web-based questionnaire design studies. Firstly, people interact differently with Internet-based and paper-based surveys. Secondly, the design of web-based surveys and general web sites is not the same. Neither the design of web-delivered surveys nor traditionally-delivered surveys is the same.

The first factor is that electronic-based surveys and traditional surveys are relatively different (Norman, 2003). One of the outstanding differences is the way that people respond to these different modes of data collection. This is shown by distinct differences between on-line and off-line behaviour that indicate differential interaction on the Internet from face-to-face, telephone and mail contexts due to anonymity (Comley, 2003; Joinson, 2003b). A psychological study of people's behaviour when participating in on-line surveys on computer networks found that people demonstrate higher levels of self-disclosure in on-line contexts (Joinson, 2003a).

Other factors are associated with the difference between web-based survey appearance and general web site appearance. The principles of web-based survey design differ from those of web site design (Norman, 2003). Norman (2005a) also

claims, as does Manfreda et al. (2002), that the design of an on-line questionnaire can decrease or increase measurement and non-response errors. “Measurement errors in surveys are deviations of the respondents’ answers from their true value on the measure” (Groves, (1989) as cited in Manfreda et al., 2002, p.10). According to Manfreda et al. (2002) wording and visual layout of the questionnaire can affect the frequency of measurement errors. Similarly, Gunn (2002) states that the details of web-based survey design can change the response rate and dropout rate. This could be due to both the application of web page design strategies and the type of programming technology used. In particular, the influence of human computer interaction impacts on conducting web-based surveys which differ from traditional survey methods (Gunn, 2002). Gunn (2002) indicates that effective Internet-based questionnaires combine novel technologies and survey methodologies. Moreover, Gunn (2002) states that not only does the effective design of a questionnaire impact on respondents’ reactions and influence survey outcomes, but is also related to other elements such as graphics and symbolic and numeric languages.

1.1.3. Persuasion mechanisms for participation in Internet surveys

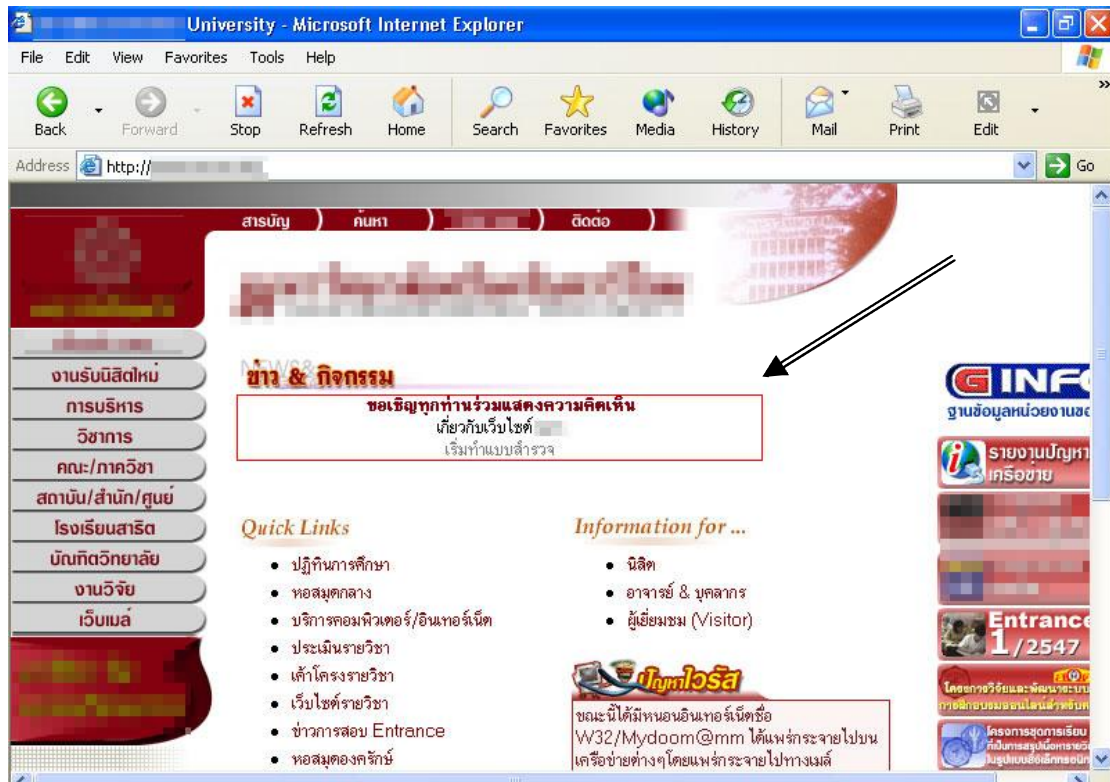
The survey response rate is not only influenced by its design but also by the range of invitation formats deployed. Using an appropriate invitation style can optimise the response rate because the invitation may persuade more visitors to complete the questionnaire. This could be because the response behaviour in web-based surveys depends on motivation, opportunity and ability to process messages (Bosnjak & Tuten, 2001). Alternatively, asking people to complete a questionnaire may imply an imposition on their time (Gunn, 2002). Time is an important consideration whatever survey method is used, but Internet users access the Internet to find information quickly and they are “often less patient and less tolerant to material that does not interest them” (Alibocus, 2001, para. 2). Researchers launching an on-line questionnaire need to generate as high a response rate as with a traditional survey. Therefore, it would seem sensible to offer more than one option when inviting participation from Internet-users.

This current study did not invite participants by using asynchronous communication modes such as email. When Internet-based surveys were utilised, the researcher did not have access to the email addresses of respondents. In the light of this, email lists

were not used as a communication instrument for this experimental study. This also ensured the anonymity of respondents. Email invitation methods are an option when the researcher has an effective email address list which is up-to-date and correct. One important barrier in using email to invite people is the number of undeliverables on a partially outdated email address list. For example, the survey conducted by Deutskens et al. (2004) had access to a large email list (5,413 emails); however, one third (1,836) were undeliverable. Although 3,577 emails were sent out, only 730 completed questionnaires were received, representing a response rate of 20 per cent approximately.

This study trialled three synchronous invitation methods: 1) an advertising marquee, 2) a pop-up window, and 3) a message box (see Figures 1.2., 1.3. and 1.4. below). These three invitation methods were presented on the homepage of a Thai university. During this launch-phase of the web-based survey, the expected participants were those who visited the university web site. Differences in three invitation methods were studied in this research, and they are described below:

Figure 1.2.: An advertising marquee on the homepage

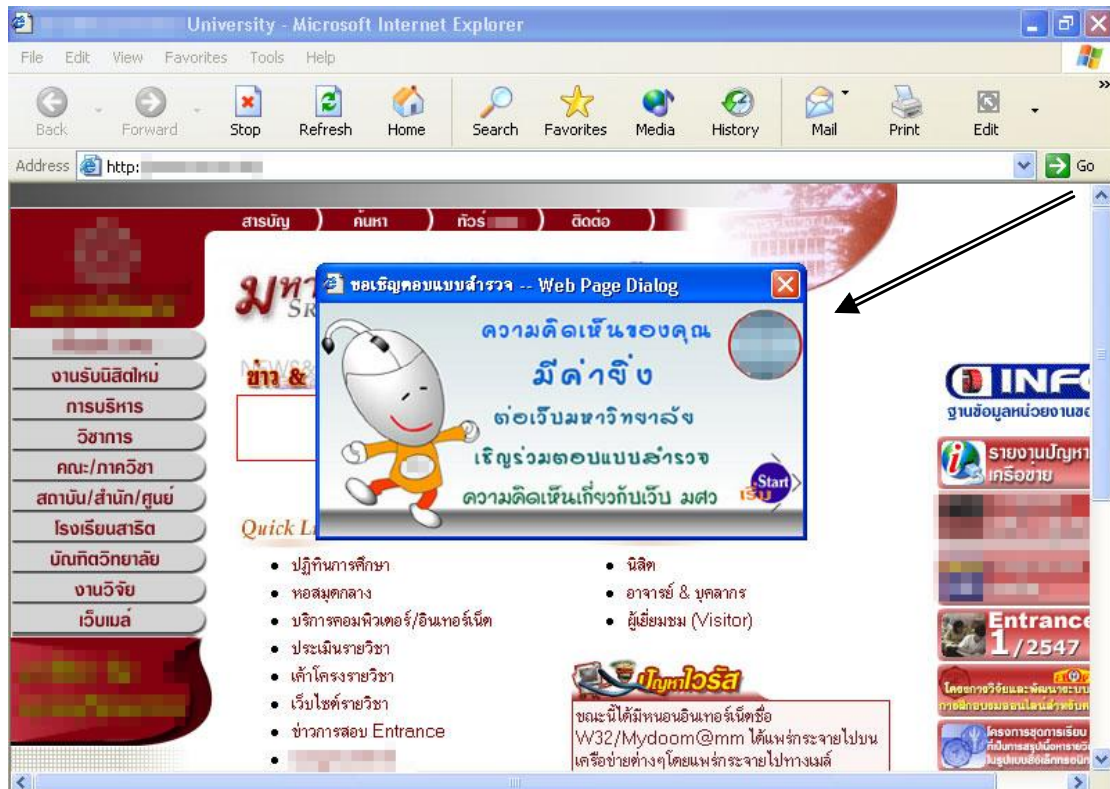


The advertising message in this picture when translated into English means:

**Please feel free to indicate your opinions
about our web site
commence survey**

The first invitation method examined in this study deployed an advertising marquee with a banner size of 468 x 60 pixels on the university homepage (see Figure 1.2.). This simple method presents no problem on any browser; it also guarantees that, even though visitors use different browsers and computer screen settings, they can actually see the same invitation.

Figure 1.3.: A pop-up window on the web site



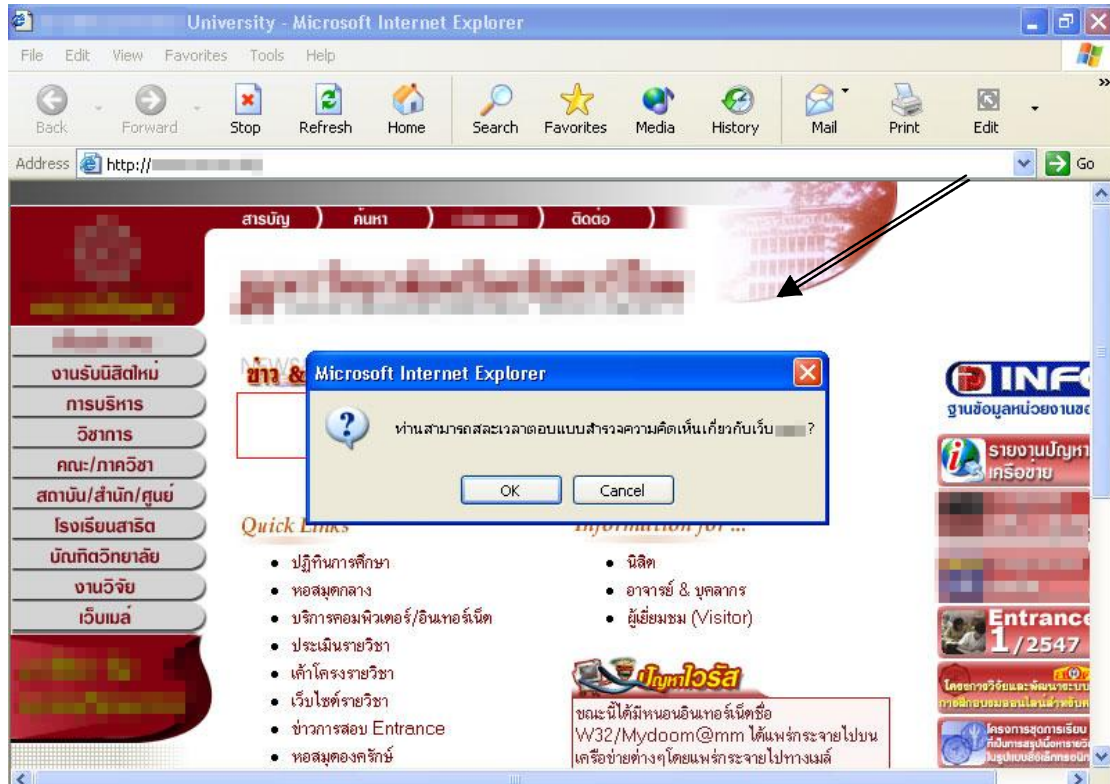
The message on the pop-up window in this picture when translated into English means:

Your opinion is valued by university
We would like you to participate in a survey
about our web site
Start

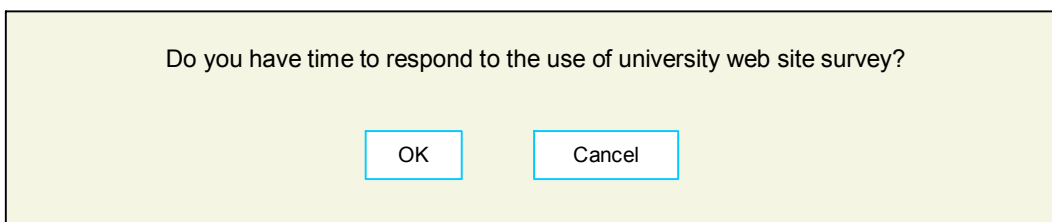
The second invitation method used was a pop-up window (see Figure 1.3.) which “pops up” or emerges when the user enters a web site, and it has provided “one of the most positive contributions to web site research” (Comley, 2000, para.2). The pop-up survey window is used broadly as a method of invitation to people to participate in Internet-based surveys when they visit a web site. One barrier to using the pop-up window is the free software that restricts all pop-up windows automatically. Examples of this free software that can close or block or eliminate pop-up windows are Ad Fighter 2.5, Popup Miner 1.1 and AntiPopUp of Internet Explorer 1.8. Therefore, pop-

up window technology that has provided previously good response rates will be confronted by the need to change in the future.

Figure 1.4.: A message box on the homepage



The message on a message box in this picture when translated into English means:



The third invitation method deploys a message box when the user clicks appropriately on any links on a homepage (see Figure 1.4.). This method was discovered by the researcher as she was searching information about on-line questionnaire design. It appears to be used randomly only at websurveyor.com. The message window will appear to ask visitors to participate in the survey when they click on any links on that web site. There has been no study or report of the response rate using the message box to invite users to complete Internet-based surveys. Additionally, the message box is one method that should be studied because the research about reading on the web

reveals that 78 per cent of users look at text while only 22 per cent look at graphics (Nielsen, 2000a).

1.1.4. Content topics in Internet-based surveys

The content topic of the Internet-based survey used in this current study is the usage of Thai university web sites. There are two main reasons why the researcher has chosen this topic. The first reason, according to Comley (2000) as cited in Manfreda et al. (2002), is that the web-based survey topics that attract the highest response rates are not concerned with broader, more general community issues, but rather more immediate issues, including issues relating to the web site itself. The second reason, as indicated by web-based survey studies in Thailand, relates to comparing two types of different topics (Keereerat, 2000). The first topic - The Use of the University's Computer Networks - had a higher response rate than the second - The New Entrance System to Thai universities. As mentioned in the early part of this paper, this current research focuses on the principles of web-based questionnaire design and an evaluation of the most effective invitation method. Therefore, this research was conducted using only one topic trialled with participants. The results of "The Use of The University Web Sites" will not be discussed in detail in this thesis.

1.1.5. Choosing a sample

The derived participants for a research study come from three different sample types: convenience samples, probability samples and hybrid approach samples, which integrate the two (Schonlau et al., 2001). Respondents to web-based surveys invited to participate through an advertising banner are self-selected volunteers who then self-administer their survey (Schonlau et al., 2001). Samples drawn from uncontrolled instrument distribution such as pop-up windows and advertising banners are self-administered, implying they are convenience samples (Schonlau et al., 2001). Even though statistical inference from the convenience sample is problematic, the convenience sample method is useful for the development of research hypotheses, defining ranges of alternatives and generating qualitative data for analysis (Schonlau et al., 2001).

According to annual reports, which have been produced since 1999 by the National Electronics and Computer Technology Centre Thailand (NECTEC), the largest group of Thai Internet-users are university students making up 74.12 per cent of the total

sample (NECTEC & NSTDA, 2000, 2001, 2002, 2003a). In addition, these reports reveal the largest group of Thai Internet-users are people who are aged between 20 and 29 years of age. They are likely to be the main group of Thai Internet users who will influence web-based survey design in general, not only in the present but also the future. Additionally, the average age of third year university students is about 20 years old. Third-year university students were chosen to be the sample because fourth-year university students were away on industry placement and therefore unavailable. The style of web-based design used in this study reflects the interests of the target group, namely university students in Thailand.

1.1.6. Summary

The use of on-line questionnaires is growing dramatically, and most likely to be in English. This study utilised Thai - a language of a different syntactical structure and script to English. Further research into web-based survey design is also needed, including invitation methods that attract Thai university students. Web-based surveys are utilised for large-scale data collection due to their affordability, efficiency and higher response rate (Alvarez et al., 2002; Alvarez & VanBeselaere, 2003; Belbey & Gedney, 2003; Bennekom, 2002; Frazee et al., 2002, 2003; Gunn, 2002; Manfreda & Vehovar, 2002a; Shannon et al., 2002; Wagner, 2003; ZDNet, 2001). Any researcher who conducts an Internet-based survey has control only over the design of the survey (Vehovar et al., 2002). In other words, web-based questionnaire design is the crucial means by which researchers can increase or decrease response rates and the accuracy of responses. Moreover, the invitation methods examined in this study attracted different response rates and some have not been previously studied anywhere in the world. This study was conducted with university students because their characteristics are congruent with the largest group of Internet users in Thailand.

1.2. Significance and purposes of the research

The findings will assist on-line researchers to develop more appropriate and better-designed Internet-based surveys. The research results provided data that indicated:

1. Appropriate formats for Internet-based surveys in a language other than English to maximize survey completion and accuracy of responses among undergraduates.

2. Effective means of encouraging university students to respond and complete Internet-based surveys in a language other than English.

This form of research is of significance as the Internet has become a major tool of rapid communication. Researchers now have the capacity to use the Internet to gather important data through Internet-based surveys in many cases.

Hence, this research project focused on two questions:

1. What kind of Internet-based surveys gain high response rates and which aspects of their implementation are crucial?
2. Which invitation method is the most effective way to encourage users of a Thai university web site to participate in Internet-based surveys?

This research entitled *Internet-based survey design for university web sites: a case study of a Thai university* will be organized into eight chapters. The format of this Ed.D thesis will be as follows:

- **Chapter One: Rationale for study** - Significance and purpose of the research.
- **Chapter Two: Survey design processes** - Background to planning a survey and comparing paper-and-pencil questionnaires and Internet-based questionnaires.
- **Chapter Three: Web-based questionnaire design** – Study of previous web-based survey design principles and crucial implementation details for conducting an Internet-based survey.
- **Chapter Four: Internet usage in Thailand** - Statistical data on Thai Internet usage which includes Thai Internet user profiles, languages used on Thai web sites, and research into Thai Internet-based surveys.
- **Chapter Five: Research strategy and data collection methods** - Scope of the study and an outline of the research strategy, which is divided into three stages: development of the content, identification of web-based survey design principles which includes observations and interviews and thirdly, evaluation of the most effective invitation method via an Internet-based survey.
- **Chapter Six: Research findings into web-based survey design principles** - The identification of web-based survey design principles based on two formal usability testing mechanisms: ‘Think Aloud Technique’ observation and focus group interviews.

- ***Chapter Seven: Research findings of the most effective invitation method*** - The results of the third stage of data collection processes, evaluation of the most effective invitation method on the Internet.
- ***Chapter Eight: Discussion and conclusions*** - Discussion of relevant findings of this current research with other studies and conclusions of the research study together with proposed recommendations for further research.

CHAPTER TWO

SURVEY DESIGN PROCESSES

It was suggested in Chapter One that Internet-based survey design has unique features though it has some processes in common with other survey types, especially the “paper-and-pencil” survey since both are self-administered. To establish and articulate clear and fundamental survey design processes for Internet-based surveys, it is crucial to gather information about and understand survey design in general and the similarities and differences in the other type.

The main purpose of this chapter is to delineate the main survey planning steps and highlight the strengths and weaknesses in self-administered surveys. Furthermore, it will elaborate on the factors that affect response rates. This chapter has been organized into the following ten sections.

- Section 2.1: *What is a survey?* - The definition of a survey, differentiating what is and is not a survey.
- Section 2.2: *Types of surveys* - A classification of surveys based on the differences due to objectives and data collection methods.
- Section 2.3: *Interview surveys* – A brief description of surveys using interview methods that include face-to-face and telephone methodologies.
- Section 2.4: *Self-administered surveys* – Details of self-administered surveys, both postal questionnaire and Internet-based questionnaire.
- Section 2.5: *Types of web-based surveys* - Various classes or types of web surveys in operation today.
- Section 2.6: *Computer enhancement of survey quality* - The automation of computer technology used in web-based surveys.
- Section 2.7: *Survey modes in comparative perspective* - The issues to be considered when selecting a survey method.
- Section 2.8: *Respondents and survey response* - The reasons and motivation as to why people respond to surveys, and types of respondents to web-based surveys.

- Section 2.9: **Survey validity** – Four main sources of errors that affect survey accuracy.
- Section 2.10: **Survey planning** – Steps in how to conduct self-administered surveys on the Internet.

2.1. What is a survey?

Generally, the word “survey” has a similar meaning to other data gathering activities, namely, “census” and “poll”. The similarity is that all use questions as instruments asking respondents for information about their attributes, attitudes, beliefs and behaviour. However, “census”, “poll” and “survey” are not all exactly the same. To investigate the differences, the on-line Cambridge Advanced Learner’s Dictionary (dictionary.cambridge.org) has been researched for the following key definitions:

A “**census**” is “a count for official purposes, especially one to count the number of people living in a country and to obtain information about them” (Cambridge University Press, 2004a) while a “**poll**” is “a study in which people are asked for their opinions about a subject or person” (Cambridge University Press, 2004b). A “**survey**”, however, is “an examination of opinions, behaviour, etc., made by asking people questions” (Cambridge University Press, 2004c). In another equally vague definition, a survey is a description of a method for gathering information from a sample of individuals (Waksberg, 2005a). Basically, “a survey is designed to permit formal statistical inference about some larger population given certain information collected from a subset of that population” (Schonlau et al., 2001, p.1).

In considering all the above, the three data collection activities are not equivalent in terms of meaning. Therefore, it is necessary to study each in more detail. Between “census”, “poll” and “survey”, there are two distinctive differences: the content of questionnaires and selection of sampling strategies.

The content used in questionnaires for a “census”, “poll” and “survey” is based on the objectives of the studies. The objective of a census is not to find out people’s opinions, but its aims are to collect demographic details at a regular period such as once in every decade as in the USA (Ericksen, 2001) or once every five years as in Australia. Comparatively, the poll is more interested in people’s attitudes and beliefs; sometimes, the poll ignores the respondent’s attributes such as gender or class. For

example, television news programs ask people about their attitudes towards some issue and receive the responses by setting up a telephone number for people who need to vote “yes” and another number for “no”. The survey, however, usually is asking about behaviour, attitudes and beliefs and always includes a demographic part (Waksberg, 2005a). Additionally, some particular surveys need participants with particular qualifications such as only onshore postgraduate students in the School of Education at RMIT University.

The selection of sampling strategies for “census”, “poll” and “survey” is also different. In practice, a census gathers information from all or almost all its population, and not merely a proportion (Waksberg, 2005a). In one sense, a census is a special type of survey, usually involving counting people and covering the whole targeted population. Additionally, the correspondence in a survey usually is personalised using named individuals, but not in a census, which is sent to household addresses instead (Dillman, 2000).

When a sample is drawn up for a survey, it is a fraction of the population being studied, especially if randomly selected, and it is assumed to represent relatively accurately the whole population (Waksberg, 2005a). The crucial objectives in conducting scientific surveys are finding accurate and unbiased results which are able to be generalised to the whole population (Doyle, 2004). The samples of surveys generally do not include only participation from volunteers but are also sometimes scientifically chosen. Conducting a standard survey demands that every person in the population has a measurable chance of selection (Waksberg, 2005a). Participants in a survey will be treated according to the same methodology and are asked the same questions (Waksberg, 2005a).

On the other hand, a poll is a measuring of public opinion usually conducted by the press and broadcast media (Waksberg, 2005a) or specialist polling organizations. The best-known type of polling is predicting the outcome of an election (Ericksen, 2001). The quality of the poll result depends on the method of sampling, especially the scientific drawing of a random sample – the greater the randomness, the more trustworthy the results (Ericksen, 2001). Generally, polls have a much smaller sample size than the census which typically uses the whole population, not a sample (Ericksen, 2001).

Therefore, surveys aim to be reliable scientific instruments for collecting data, and the results can be inferred to the larger population. Questionnaires are basic instruments used in a census, survey or a poll. Among these three data gathering activities, there are distinctive differences: the content asked in the questionnaire and the selection method used in developing the sample. Generally, surveys aim to measure more precisely people's attitudes. Survey results are a reflection of community interest and also may forecast what will be of interest in the future.

2.2. Types of surveys

Surveys have been categorised into various types based on objectives and data collection methodology. The primary classification and differentiation for surveys relate to qualitative and quantitative surveys (Brown, Kaul, Holter, & Hill, 2004). Qualitative surveys are designed for the participation of interested groups of a targeted audience in order to elicit the depth and range of attitudes and beliefs (Brown et al., 2004). Surveys using interview and observation are grouped as qualitative surveys (Brown et al., 2004).

Quantitative surveys, on the other hand, provide statistically quantifiable data from a sample of the target population (Brown et al., 2004). Quantitative survey methods include on-line surveys, mail surveys, personal quantitative interviews and telephone surveys (Brown et al., 2004).

Other researchers provide different survey classifications: surveys are categorised into two groups based on collection methods: self-reported data and survey interview (Schonlau et al., 2001; Waksberg, 2005c). Similarly, another study classifies surveys into two broad categories: the questionnaire and the interview (Trochim, 2000). The self-report survey which usually uses questionnaires as instrumentation includes mail, fax and Internet-based surveys (Waksberg, 2005c). On the other hand, interview surveys are conducted by an interviewer with the respondent in a face-to face or telephone interview (Trochim, 2000; Waksberg, 2005c). In some research studies, hybrid modes of data collection have been utilized (Trochim, 2000). For instance, questionnaires, which usually include many short, close-ended questions, are complemented by some open-ended questions. While interviews usually include broad, open-ended questions, there will often be a series of closed-ended questions asked in an interview.

In the early 21st century, there are not only many different methods of surveys but also sub-variations of modes. However, there are at least five survey methods that are extensively used: face-to-face interviews, telephone interviews, postal questionnaires, Internet questionnaires and Interactive Voice Response (IVR) (Dillman, 2002). However, there are four fundamental survey methods: face-to-face interviews, telephone interviews, postal self-administered questionnaires and Internet surveys (de Vaus, 2002). The literature review of this thesis is limited to these four types, which are the basic survey methods used in research studies in Thailand.

The survey is a data collection tool deployed to elicit the required information (Waksberg, 2005d). Some data can be collected only by an experiment, not by a survey (Waksberg, 2005d). A survey can relate to human or to non-human populations. Surveys are very powerful and useful instruments for collecting data on human characteristics, attitudes, thoughts and behaviours. Selecting the appropriate survey delivery modes depends on the research objectives, time requirements and budget (Brown et al., 2004; Waksberg, 2005d). A survey questionnaire is the most frequently used measurement instrument in the social sciences (Kogovsek, 2006).

This section on survey methods is organised into two main parts based on two survey data collection methods: interview surveys and self-administered surveys. The first section describes the survey administration of face-to-face interviews and telephone interviews. The second section outlines two basic types of self-administered surveys: postal questionnaires and Internet-based questionnaires.

2.3. Interview surveys

Interviews are mechanisms for gathering qualitative data in the research. Normally, the researchers use interviews for finding out either detailed information or an in-depth insight into the topic (Denscombe, 2003; Frey & Oishi, 1995). There are two main types of interviews: face-to-face interviews and telephone interviews.

2.3.1. Face-to-face interviews

Face-to-face interviews or personal interview can be conducted at various places such as at the respondents' home by appointment, at a shopping mall, at the school, in the office and on the street (Frey & Oishi, 1995; Zucker & Eaton, 2006). It is a direct way of engaging with a sample of the target population (Zucker & Eaton, 2006). The

obvious benefit of face-to-face interviews is the capacity to obtain longer interviews than over the phone; also in a commercial survey, the interviewee can see, feel and/or taste a product whose sales potential is being assessed (Zucker & Eaton, 2006). Nevertheless, face-to face interviews usually cost more per interview than other methods because travel time, employment costs and safety of both the interviewers and interviewees need to be considered (Frey & Oishi, 1995; Zucker & Eaton, 2006).

2.3.2. Telephone interviews

The telephone survey is the most popular interviewing method in the USA (Zucker & Eaton, 2006). In the 1980s and 1990s, telephone surveys have been the standard survey method since telephones are a basic fixture for all businesses and most homes in the USA (Dillman, 2000). Additionally, telephone surveying is the first survey method to benefit from computerised survey methods such as Computer-Assisted Telephone Interviewing (CATI) (Dillman, 2000). The rationale supporting the use of telephone interviews as survey tools relates to coverage of population, time effectiveness, ability to randomise and the ability to skip questions and obtain more answers. Telephone interviewing has become an increasingly popular means of conducting survey research because of its cost-efficiency and speed of data collection (Frey & Oishi, 1995)

The telephone interview can in theory cover almost the entire population of a country. In America, 96 per cent of homes have telephones (Zucker & Eaton, 2006). The telephone interview is a faster way to contact people than with other methods (Zucker & Eaton, 2006). In particular, the survey that utilizes Computer-Assisted Telephone Interviewing (CATI) where results are recorded automatically upon completion has become very popular (Zucker & Eaton, 2006). The random telephone number method can be used when the actual telephone numbers of potential respondents are not available (Zucker & Eaton, 2006). Usually, CATI software makes the interview more logical because it can skip questions automatically, perform calculations and modify questions based on the answers to earlier questions (Zucker & Eaton, 2006). Participants tend to give longer or more complete answers to skilled interviewers than when they respond to mail and email surveys, even though web-based surveys often have longer answers (Zucker & Eaton, 2006). Moreover, an unclear answer can be clarified through elaboration (Zucker & Eaton, 2006).

However, there are increasing restrictions in using telephone interviews. For example, over half of the homes in America have answering machines and use them to screen calls (Zucker & Eaton, 2006). Also increasingly, people feel reluctant to respond to phone interviews because some interviewers endeavour instead to sell a product. Time is now more limited for a telephone interview because women tend to work in the day time whilst in the evening, an interview may interrupt a family dinner or a favourite TV program (Zucker & Eaton, 2006). The capacity of respondents to visualise products in the absence of any visual cues is also limited unless the interviewer is a skilled communicator (Zucker & Eaton, 2006).

2.4. Self-administered surveys

One of the distinctive differences between self-administered questionnaires and interview surveys is the design of questions. The design of questionnaires used in self-administered surveys is more difficult than interview surveys because the designer has to plan for a range of respondent interpretations and interests (Waksberg, 2005c).

The two main types of questionnaire usually used in self-report data are paper-based and Internet-based. Both types exhibit similar visual characteristics. Consequently, some of the instruments, components and strategies used in paper-based or postal questionnaires can be used in Internet-based surveys (Bauman, Jobity, Airey, & Atak, 2000; de Vaus, 2002).

2.4.1. Postal questionnaires

Postal questionnaires need to be effectively designed to secure an adequate completion rate by making respondents feel comfortable that they have the time to finish and that they would like to finish. The meaning of questions in mail surveys must be explanatory and easy to follow (de Vaus, 2002). Postal questionnaires rely upon asynchronous communication between authors and participants. A postal survey is appropriate when a database is up to date but has only the names and addresses of the target sample making telephone surveys cumbersome and time-consuming (Zucker & Eaton, 2006). Answering mail surveys is more flexible than other methods because participants can complete it by themselves without feeling pressured or being intruded upon as in other types of surveys (Zucker & Eaton, 2006). Similar to Internet-based surveys, mail surveys gather more creditable answers if the survey topic is of interest to the target sample (Waksberg, 2005f; Zucker & Eaton, 2006).

However, postal questionnaires are paper-based; computer technology has been used as a survey instrument - some surveys are distributed in digital mode and delivered on a floppy disk as computer-based questionnaires that are called Disk by Mail or Computer-assisted self questionnaires(de Vaus, 2002). The disks by mail are self-coding, providing the technology for automatic skips, control of question order and reduced non-response items (de Vaus, 2002). However, the disks by mail survey method requires participants to have computer literacy and access to computers (de Vaus, 2002). Moreover, the disk by mail survey method also needs the respondent to provide personal space and time in terms of their motivation and time to complete and then return the disk to the research team.

2.4.2. Internet-based surveys

Internet-based surveys cover quite a broad umbrella. As mentioned, email was the first Internet tool to be utilized for survey research, beginning in the 1980s (Truell, 2003). Internet-based surveys have become a popular way of administering questionnaires from the mid-90s (de Vaus, 2002), and increasingly used in preference to postal surveys because it is believed they are faster, cheaper, easier and attract a better response quality than the traditional survey (Schonlau et al., 2001).

According to Schonlau et al. (2001) the Internet-based survey method should be considered as an appropriate platform in the following cases:

- **Conducting a self-administered survey with a selected sample**– This occurs when a respondent selected into the sample may not be known - this often occurs in self-administered surveys. For example, the invitation to participate in a survey is announced on an advertising banner, newsgroups, discussion board and in traditional media such as newspapers or magazines for attracting a large number of survey respondents.
- **Conducting a survey in an organization having a list of email addresses for the target population** - This is the greatest benefit in terms of cost and timeliness. It is useful for an organization that maintains a standardized email address system.

- **A small proportion of the total population can be inferred to the target population** - The cost efficiency of the Internet-based survey is greater than random digital dialing (RDD) and mail-out when obtaining targets from a subpopulation directly from its panel database.
- **The survey demands a moderately large sample** - This is because conducting a survey includes a larger initial start-up cost than postal or phone surveys, but the Internet-based survey has a lower marginal cost per survey respondent. In their case study, Schonlau et al. (2001) estimated that adding a web response option to an existing mail survey was cost effective when at least 580 completed questionnaires were obtained over the Web.
- **The survey contains sensitive questions.** A survey asking questions on a sensitive topic such as drug addiction, can avoid bias from the interviewer by being conducted in a self-administered survey method through web-based and mail-out mechanisms.
- **The questionnaire contains many important open-ended questions.** People give longer answers to open-ended questions in electronic surveys than open-ended questions in printed surveys (Schonlau et al., 2001).
- **The survey requires multimedia and interactive elements to support understanding.** A web-based survey harnesses technology in conducting a survey at a reasonably lower cost compared with other survey methods.

Internet-based surveys can be provided both via Intranet and Internet. When web-based questionnaires are run through an Intranet system, it is similar to the computer direct interview interaction where the respondents enter their own answers directly into a computer, which is set up with the software for a survey (Zucker & Eaton, 2006). The computer-direct interviews can be conducted in various places where there is an Internet connection available in places such as malls, trade shows, universities and offices (Zucker & Eaton, 2006).

The basic types of on-line surveys based on an interface activity are a plain text version embedded or attached in email and an interactive version presented on a web browser. There are three basic approaches to sending questionnaires to participants

via the Internet: email, web-based questionnaires and an integration of both email and web-based methods (de Vaus, 2002).

In the early 1990s, Internet-based survey development tools were extremely limited but many more options have become available during the past decade (MacElroy, 1999). MacElroy (1999) indicates that there are seven methods of on-line surveys being used for commercial purposes, which are arranged in order from normal to high technology. These are:

1. email (text);
2. bulletin boards;
3. web page using “Hyper Text Markup Language (HTML)”;
4. web fixed-form interactive;
5. web customized interactive;
6. downloadable surveys and
7. web-moderated interviewing: chat interviewing and other discussion formats that use qualitative interviews.

Of the seven types of Internet surveys listed by MacElroy, (1999), the first, “email”, is the same method as referred to by de Vaus (2002). The second type, the bulletin board, gathers data by posting a questionnaire on the web board and receiving answers when participants answer the questions on the web board. The next three (third to fifth), the HTML web page, web fixed-form interactive and web customized interactive, can be grouped under the category of “web-based surveys”. This is because these three types gather data by interacting on web page technology through a web browser. The sixth, downloadable surveys, are applications, which are software designed to run on respondents’ computers. The last type, web-moderated interviewing, is the Internet technology usage for on-line quality survey as distance interviewing via the net. It has been estimated that almost 80 per cent of all survey data being collected on the Internet are being done using web HTML survey forms (MacElroy, 1999). Therefore, this current study is the study of web-based questionnaire design for users of Thai university web sites. The following information pertains to email surveys and web-based surveys that are the most commonly used on the Internet.

2.4.2.1. Email Surveys

Email surveys have been divided into three forms (de Vaus, 2002). The most basic form of email survey uses plain text questions embedded on an email message where the respondent simply types the answers in reply. The second form is a Word document or HTML questionnaire file sent as an attachment. Both forms of email survey are detailed in other studies such as those by Schonlau et al. (2001) and Dommeyer and Moriarty (2000). The third type of email survey is an interactive questionnaire or computer-assisted self-interview in an email attachment, whereby all participants return the questionnaire by simply replying to the email.

A comparison of these two forms of email survey (embedded and attached to the word processor file) indicates that the simple version or the embedded survey gain a significantly higher response rate than the attached survey (Dommeyer & Moriarty, 2000). However, there is no difference between the two methods on the number of item omissions or response bias or response speed (Dommeyer & Moriarty, 2000). The ease of response to an embedded survey by simply clicking the reply button, with the possibility for the respondent to include messages common to an on-line survey form, is a factor in why a respondent prefers the embedded mechanism rather than an attached survey (Dommeyer & Moriarty, 2000). The attached survey requires multiple steps that include opening the file with the appropriate software which places a potentially onerous burden on the respondent who may choose not to reply in preference to downloading or seeking software updates in order to read the text. In addition, participants must attach the file when returning the survey and some respondents may not know how to attach the document correctly (Dommeyer & Moriarty, 2000). In some situations, respondents have only a restricted option by which a document can not be downloaded and be run on public computers – this means the attached survey has more limitations. In addition, the fear of virus contamination can render email users unwilling to open file attachments, thereby affecting response rates.

Email has not only been used to conduct surveys but also as an invitation method for an Internet survey. The invitation email can be sent systematically and randomly to possible participants as a covering letter, which includes the link to the web-based questionnaire. Using email surveys cannot only randomize the population but also can

employ a follow-up technique. Email surveys are both very economical and fast (Zucker & Eaton, 2006). The time taken to receive a response from an email survey is very quick, since users just click on the reply button (Zucker & Eaton, 2006). After the survey system has been completely set up, there is no charge for following up (Zucker & Eaton, 2006).

Using email as an invitation method which includes user ID and password to avoid resubmission, participants have to consider the ambiguity of letters and numbers. For example, people confuse reading the alphabetical letters l (el) and o (oh) and the numbers 1 (one) and 0 (zero) at a statistically significant level ($p < .05$) (Couper, Traugott, & Lamias, 2001; Schonlau et al., 2001).

There are, however, several obstacles in conducting surveys via email. The first drawback in an email survey is the obvious requirement to purchase or possess a list of email addresses (Zucker & Eaton, 2006). To purchase the email address list will increase the cost of conducting a survey, and this usually means paying each time when sending an email to participants. This will also affect the use of pre-notification and follow-up procedures to gain a better response rate. On the other hand, email surveys will be a quality tool for surveys of organizations such as universities and government offices, which maintain email databases that list staff by identity number. In this case, the survey researcher might have an opportunity to use scientific sampling techniques such as generating a random sample.

The second issue regarding email surveys is respondent fatigue. Even when the survey researcher obtains an email address list, people tend not to open or answer unsolicited emails from an unknown organization or person. Email overload and too many uninvited, unwanted emails or spam emails (Bachmann, Elfrink, & Vazzana, 2000; Manfreda & Vehovar, 2002a), make people tend not to open or read email-based surveys (Zucker & Eaton, 2006). Additionally, the lack of anonymity of the email affects participants' decision responding to any questionnaire (Couper, Blair, & Triplett, 1999).

The third problem with email surveys is the higher rate of undeliverable email compared with traditional mail. This happens because people are changing their email addresses more easily and, thus, frequently (Dommeyer & Moriarty, 2000).

Additionally, most Internet users still feel reluctant to disclose security and privacy contact details as email addresses or individual details (Lang, 2005). Therefore, the non-deliverable aspect of administration are a major difficulty for email surveys (Bachmann et al., 2000).

2.4.2.2. *Web-based surveys*

Web-based or Internet surveys are questionnaires, which combine all the dynamic and interactive features presented on a web browser application (de Vaus, 2002). The web-based surveys are questionnaires in the Hypertext Mark-up Language (HTML) format (Dillman, 2000; MacElroy, 1999). It should be noted that HTML is the web code, HTML is a system of tagging text to enable it to be displayed in styles such as bold, italic and so on (Glenwright, 2003). However, today, the computer scripts used for creating web-based surveys are not only standard compliant HTML but also any script language can be used which is presentable by browser such as Java, Pearl, Active Server Pages (ASP), Cold Fusion Mark up Language (CFM), Extensible Mark-up Language (XML) and so on.

Due to the flexibility of displaying multimedia on a web page, the web-based questionnaire is superior to an email survey in terms of questionnaire layout, using different font colours and styles to emphasise some key words and to automate interaction. The interactive computer functions that can improve response quality will be discussed in a later section. However, as previously stated, the survey researcher needs to consider the presentation and interactive functions or, in other words, the technological environment of web-based questionnaires (Vehovar et al., 2002). In comparison, the visual images of web-based questionnaires from both the survey researchers' and respondents' perspectives, might not be the same because Internet users might use different web browser versions and screen configurations (Dillman, 2000; Vehovar et al., 2002).

To manipulate the visual imagery of web-based questionnaires, there needs to take place a testing of web pages in cross platform such as PC and Macintosh, experimenting with screen configurations such as 640 x 480, 800 x 600 or 1024 x 768 pixels (Glenwright, 2003). Based on the standard of web page development, the web-based survey needs to conduct usability testings in the early stage. Furthermore, web accessibility is a relevant legal standard in many countries such as section 508 in the

Rehabilitation Act Amendments of 1998 in the USA (Henry, 2004), and section 24 in the Disability Discrimination Act 1992 (DDA) in Australia (Alexander, 2004). The Web Content Accessibility Guidelines 1.0 by the World Wide Web Consortium, which is the fundamental of web accessibility standard, will be discussed in Chapter Three.

The study of the development of an effective web-based survey is still in its infancy even though much exploratory work has been done (Solomon, 2001). For example, the effectiveness of different formats for web-based surveys (screen-by-screen or a scrolling page) remains unclear (Dillman, 2000).

One item per page or screen-by-screen format displaying only one individual question which respondents answer before clicking on the “next” button, has several advantages (Dillman, 2000). The screen-by-screen format requires shorter download time per page when compared with multiple items per screen but it requires more clicks to complete the form. However, web graphic designers can reduce omissions with a requirement to answer each question before progressing to the next page. Additionally, the one item per page format may be viewed in a smaller window, which perhaps is a preferable format for those users who open many windows at the same time.

The scrolling page, on the other hand, usually displays one complete section of the questionnaire or even all questions. The respondents are able to scroll up and down to read through the questionnaire before commencement, and this allows users to ascertain the extent of the questionnaire. Participants may forget to answer questions or may want to ignore difficult questions; the researcher will lose some individual responses if the web-based survey does not have a remind function after clicking the submit button. It is possible that respondents may prefer multiple items per page or a scrolling page because they can see the extent of the questionnaire before making the decision to complete or not complete a questionnaire.

The operations of web-based surveys vary in practice, based on the same theories used in traditional survey sample methods. Web-based survey samples are derived from convenience samples or non-probability samples and random samples or

probability samples (Couper, 2000). Some researchers use a hybrid approach (Couper, 2000; Schonlau et al., 2001).

A non-probability sample is “a simple example of an uncontrolled instrument distribution” utilizing volunteer and self-administered respondents (Schonlau et al., 2001, p.35). Web-based surveys using the non-probability sample have become ubiquitous due to lower cost, less administration time and easier self-management (Schonlau et al., 2001). However, the statistical inference becomes problematic with the non-probability sample (Schonlau et al., 2001). The probability samples are derived from randomization from closed populations, general populations, and pre-recruited panels (Schonlau et al., 2001). In closed populations, for example, in universities where they manage email systems for both staff and students, it is often possible to draw a probability sample that allows for contacting potential survey respondents via email (Schonlau et al., 2001). This capability is useful for conducting surveys via email.

The prevalent web-based survey today has various methods of operation which are categorized into two main sample methods: the non-probability method and the probability method, as summarized in Table 2.1.

Table 2.1.: Types of web surveys

Source: Couper, (2000)

Non-probability methods	Probability-based methods
1. Poll as entertainment	1. Intercept surveys
2. Unrestricted self-administered surveys	2. List-based samples
3. Volunteer opt-in panels	3. Web option in mixed-mode surveys
	4. Pre-recruited panels of Internet users
	5. Pre-recruited panels of full population

2.5. Types of web-based surveys

This section is information of web-based surveys types conducted on the Internet. The purpose of this section is to outline the methodologies used in each type of web-based surveys by detailing the differences among surveys conducted on the Internet. The web-based survey operations are categorized into two main classifications based on

the recruitment techniques that aim at non-probability and probability samples (see Table 2.1.).

2.5.1. Non-probability methods web-based survey

Entertainment polls, unrestricted self-administered surveys and volunteer opt-in panels use the non-probability sampling techniques. In non-probability surveys, samples are not obtained by random, and some researchers state that non-probability methods are quite unscientific (Couper, 2000; O'Neill, Mitofsky, & Humphrey, 2006). The first type of non-probability sample, entertainment polls, included two operations of a web-based survey that are both ubiquitous: a poll web site and a poll embedded in a web site. These poll web sites usually have no limitations on question topics, and this also means that there is no system for screening or filtering respondents - this is similar to media polls or in other words - telephone polls conducted by television and radio stations. As mentioned earlier in this chapter, such a poll is not a genuine survey, even though Internet polls have similar characteristics to the Internet-based survey.

The second type, unrestricted self-administered surveys might be the most prevalent format of web-based survey today (Couper, 2000). The self-administered, web-based surveys are on-line questionnaires that Internet users access by simply clicking on advertising banners which are posted on web sites. Most marketing research on the Internet that use advertising banners, email lists and other similar opt-in panels, do not intend to randomly select samples (Rivers, 2006). The response rates for marketing research on the Internet are in the range of 20 per cent (Rivers, 2006).

The third type, the volunteer panels of Internet users, are the fastest-growing segment of the web survey industry (Couper, 2000). This might be because Internet users feel more confident to participate in the online activities (Joinson, 2003c). The respondents will be screened from a database based on their demographic background details to match the survey requirements and they will be invited via an email and receive a password. One assumption of the non-probability web-based survey researcher is that if demographic characteristics of the non-probability and probability samples are matching, this provides the rationale that the respondents are representative of the general population (Couper, 2000; Rivers, 2006).

2.5.2. Probability-based methods

The probability sampling techniques are used in intercept surveys, list-based samples, web option in mixed-mode surveys, pre-recruited panels of Internet users and the pre-recruited panel of a full population. Each type of web-based survey has a different process of obtaining their samples as described below.

The first method, intercept surveys, might use a systematic sampling method to invite every ninth visitor or appropriate multiple of the web site (Couper, 2000). The population of intercept web-based survey is defined as web site visitors. The intercept surveys using pop-up windows to invite Internet users to participate in the web-based survey gained about 15 per cent of the visitor sample for 30 days of surveying (McLaughlin, (2000) as cited in Couper, (2000)). Concern with the low response rate of the intercept surveys is related to possible biases in the non-responding group profile.

The second type, list-based samples of high-coverage populations are those web-based surveys conducted on the Intranet/Internet, that recruit respondents from an organization's database (Couper, 2000). The strategy of using list-based samples of high-coverage populations is growing in popularity in organizations that have access to the network. This might be because using this kind of samples might gather more accurate research results which reduce the coverage errors and sampling errors.

The third method, mixed-mode designs with choice of completion method are conducted by contacting respondents and offering them either a paper-based or web-based survey (Couper, 2000). It does happen that people who receive a postal questionnaire and an option to complete it on the Internet prefer to fill the paper form (Couper, 2000). Thus the investment of offering a web-based survey for this method might be ineffective when contacting participants by post.

The fourth type, pre-recruited panels of Internet users refers to surveys that employ pre-recruited panels of Internet users by using the **Random-Digit Dialling (RDD)** telephone survey. Then interviewing participants to recruit for eligible persons and asking for the email address in order to complete the questionnaire via the Internet (Couper, 2000). The objective of the pre-recruited panels of Internet users is to obtain

a probability sample of Internet users. The response rate of this approach is low because it can lose many potential participants at the step of invitation via email.

The fifth method, the probability sample for full population web-based surveys is generated by using RDD to first contact people, and then provide Internet access to participants who cannot connect to the net (Couper, 2000). Two key benefits of probability samples gained through the full population approach are reduction of both coverage error and diversity of browser standardisation. This approach attempts to retain the respondents who have been randomly chosen from RDD.

2.6. Computer enhancement of survey quality

The remarkable efficiency of the Internet-based survey by computer technology can enhance on-line survey response quality (Rice, 2002). Dillman et al., (2003) and the University of Texas at Austin (2004) suggest that the flexibility in providing computer technologies can improve responses with better quality. According to de Vaus (2002), there are 12 mechanisms whereby the computer-based survey can assist respondents in completing a form more precisely. These 12 mechanisms can be categorised into two main groups: computer program backend and computer interface presentation.

2.6.1. The computer program backend functions

The computer program backend functions include: complex filtering, piping, feedback, error checking, and consistency checks, enforcing question answering requirements, automatic coding and data file creation.

- **“Complex filtering”** is the computer survey application that arranges for the appropriate questions to be presented to respondents based on previous answers using filtering technology (de Vaus, 2002). This particular software thus reduces the time for reading the questionnaire.
- **“Piping”** occurs where a previous answer determines the following questions in order to present more specialised or focussed questions (de Vaus, 2002). Piping technology is useful in longitudinal surveys since the participant will be asked only questions that concern their experience. On the other hand, the survey will gather more precise data from respondents.

- **“Feedback”** is the computer administered questionnaire that can provide immediate feedback to respondents who either make mistakes or give incomplete answers (de Vaus, 2002).
- **“Error checking”** detects response errors. The Internet-based program can alert an error message to users when entering the data incorrectly (The University of Texas at Austin, 2004).
- **“Consistency checks”** can be built into the questionnaire application in order to protect wrong answers from the respondents.
- **“Enforcement of question-answering requirements”** placed upon respondents in any requirement to answer a question properly is important to data analysis sections and can be enforced. The survey application can prevent errors that do not conform to the instructions.
- **“Automatic coding and data file creation”** is the application that can automatically create and record information from the survey to a database (de Vaus, 2002; Rice, 2002). This process saves time and money and also eliminates coding errors.
- **“Sample controls”** refers to two main issues in controlling the sample on the Internet: screening respondents’ demographic background and preventing multiple submissions. The computer-based survey can determine whether the potential participant fits a quota obligation, which saves time for respondents who do not have the required demographic background. This technique is used to filter respondents who have some demographic background detail that is not wanted for answering the survey.

2.6.2. The computer interface presentations

The computer interface presentations include: more engaging interface, range of response types, random questions order and order of answering.

- **“More engaging interface”**: computer-based surveys have no limitation in presenting multimedia segments, especially if using a different font, background, photos, audio, video clip and 3-dimensional graphics. Using multimedia material in survey form can produce a more attractive questionnaire that can improve response rates.

- **“Range of response types”**: computer-based surveys can present response types in a greater variety of ways such as graphical sliding scales and dropdown list menus. This provides support to respondents, as it requires less time and effort to complete and return the questionnaire.
- **“Random question order”**: the random question order technique is used for reducing response sets. For example, in a study of attitude statements, some negative questions will be randomly inserted.
- **“Order of answering”**: computer-based questionnaires can generate the order of options to reduce the effect of choosing the same items without reading the questions. This function can improve the response quality of the survey.

In conclusion, the degree of automation allowed by computer technology in survey design greatly enhances response quality and data entry which in turn enhances the accuracy of Internet or web-based surveys.

2.7. Survey modes in comparative perspective

There are many issues that need to be addressed in selecting an appropriate survey method. This section compares the two basic types of self-administered surveys: paper-based questionnaires and Internet-based questionnaires. The purpose of the comparison, based on the literature, is to assess their main strengths and weaknesses to present important considerations in planning a survey. It is based partly on published research findings and also on theoretical arguments. Eight issues will be discussed:

- 1) Time efficiency
- 2) Cost benefits
- 3) Response rates
- 4) Quality of response
- 5) Multimedia requirement
- 6) Population literacy level
- 7) Sensitivity level of topics and
- 8) Population accessibility.

2.7.1. Time efficiency

The greatest strength of web-based survey data collection is that it eliminates the need for researchers to collect, collate, enter and process the data (The University of Texas at Austin, 2004). Furthermore, well-educated participants, such as university undergraduate and postgraduate students, respond to web-based surveys faster than other groups (Biffignandi, Pratesi, L.Manfreda, & Vehovar, 2002). Not only is the speed of gathering data fast (Zucker & Eaton, 2006) but also the processing of the data, (Roztocki & Lahri, 2003) which are factors that make the speed of web-based surveying attractive. Traditional mail surveys demand a longer time in receiving an answer when compared with other surveys (Zucker & Eaton, 2006). One expectation for using web-based surveys is to facilitate a quick turnaround (Eaton, 1997; Eiler & Fetterman, 2000). Additionally, Internet-based survey supports real-time display of results (Lovelock, 2003; The University of Texas at Austin, 2004).

It is estimated in the relevant studies where both traditional mail and the Internet were used to deliver surveys that the average time for postal surveys to be returned took 11.8 days while email surveys took 7.6 days (Sheehan & McMillan, 1999). Similarly, one study comparing response times indicated that 45 per cent of all Internet-based responses were received within 1 day and 83 per cent were received by the 5th day (Shannon & Bradshaw, 2002). However, in the same study, it took 10 days to gather 25 per cent of the sample and two weeks to achieve a 50 per cent result for posted questionnaires (Shannon & Bradshaw, 2002).

The speed of a web-based survey is quicker than the traditional format in a study with middle and senior level managers who were members of the Council of Logistics Management (Griffis, Goldsby, & Cooper, 2003). Griffis et al. (2003) found that the characteristics of respondents in both the web-based and paper-based modes were not significantly different; however, a 47 per cent response rate was achieved within eight hours of making email contacts. The results of the survey that are conducted annually indicated that the Internet-based survey is more time effective. The mean number of days for an email survey in 1998 was 4.3 days, and in 1995 it was 4.7 days compared to two mail surveys in 1998, which were 18.3 days and 11.2 days respectively (Bachmann et al., 2000).

2.7.2. Cost benefits

The cost of conducting a self-administered survey includes three main elements: mailing, data entry and labour for design and operations (Schonlau et al., 2001). When conducting surveys with a large sample, the cost of a web-based survey will be less than a paper-based survey since postal costs are eliminated (Schonlau et al., 2001; Sheehan, 2001; Zucker & Eaton, 2006). The costs of conducting an Internet-based questionnaire include administrative costs, server access costs and possible costs in obtaining email lists (de Vaus, 2002; Zucker & Eaton, 2006). Additionally, there are the salary costs for designers and programmers though paper-based questionnaires also have to bear the salary costs of the designers and associated administrative staff (Schonlau et al., 2001). Web-based survey costs will be very economical when organizations such as universities or companies use their own servers and email address lists (Burkey & Kuechler, 2003). Therefore, the savings from mailing and data entry reduce the per-unit or marginal cost of web-based surveys (Schonlau et al., 2001). The following section details a case study that focuses on comparing the cost of postal questionnaires and on-line questionnaires.

The cost of web-based surveys with large numbers in the sample from a few hundred to a thousand, as found by Schonlau et al. (2001), reveals that the overall cost of the web mode is cheaper than the overall cost of mail mode. The relative costs of conducting email surveys and web-based surveys that use the Internet as a contact mode are not only determined by sample size (Crawford, McCabe, Couper, & Boyd, 2002). The costs of an Internet-based survey decrease significantly as the sample sizes increase (Watt, (1999) as cited in Sheehan, (2001)). The administration costs of email surveys are approximately five to 20 per cent that of paper-based survey administration costs (Sheehan & Hoy, 1999; Weible & Wallace, 1998). An analysis of documentation about costs for conducting paper-based surveys and Internet-based surveys indicated that the digital mode costs only about one-third of traditional surveys (Roztocki & Lahri, 2003).

For example, in a survey at the University of Michigan in 2001, the results revealed that “the overall cost of fielding the mail survey to 3,500 respondents was 40% more than the overall cost of fielding the web survey to the same number of respondents” (Crawford et al., 2002, p.5). It shows that the cost per completed questionnaire of the

mail survey cost approximately 222 per cent more than the rate for the web survey (Crawford et al., 2002, p.5). The total cost of conducting a web-based survey is cheaper because when completed, no further costs are required for printing and posting (Crawford et al., 2002). The differential cost of web surveys is related to the length and complexity of programming the survey (Crawford et al., 2002).

In another example, a survey conducted at Linköping University in Sweden, which had 449 respondents for the mail element and 1,486 respondents for the web element revealed that paper-based survey costs are greater than web survey costs by approximately 20 per cent (Forsman & Varedian, 2002). Comparisons of cost in conducting a survey which used a postal survey (n = 189) and a web-based survey (n = 188) revealed that the cost of the Internet-based survey was much lower (Shannon & Bradshaw, 2002).

Other factors that influence the mail questionnaire are the pre-notice letter to inform people before the survey, sending the questionnaire form, the follow-up of the questionnaire and the mailing of any incentives result in augmenting the mailing costs (Shannon et al., 2002; Zucker & Eaton, 2006).

2.7.3. Response rates

The factors that influence survey response rates are the use of incentives (Deutskens et al., 2004; Lang, 2005; yourenvoy.com, 2003), the length and topic of the questionnaire (Lang, 2005; Sheehan, 2001; Zucker & Eaton, 2006), and the number of follow up contacts (Sheehan, 2001; yourenvoy.com, 2003). Moreover, the other significant factors effecting response rates are pre-notification and follow up procedures, endorsement by a university or professional body, advice of cut-off dates, visual design and questionnaire formatting, the delivery medium used, personalisation, confidentiality, the reputation of the researcher, the proximity of the researcher to the participants, and the quality of the sampling frame (Lang, 2005).

Therefore, this evidence assumes that response rate is affected by many variables; it is more precise to compare the average response rate of each type of survey rather than compare the response rate of each survey.

Basically, mail surveys gain low response rates from populations with limited education and low literacy levels (Zucker & Eaton, 2006). Comparatively, mail

survey response rates vary from as low as three per cent up to ninety per cent in well-educated populations (Zucker & Eaton, 2006). The average response rate of Internet-based surveys from a meta-analysis of 49 studies is approximately 40 per cent (Cook, Heath & Thompson, (2000) as cited in Shannon & Bradshaw, (2002)). The best response levels are achieved from the surveys on interesting topics targeted at highly educated people (Zucker & Eaton, 2006). The next section details each experimental study that reveals that different variables affect survey response rates.

On the one hand, the response rates from web-based surveys are increasing when surveys are conducted with well-educated populations, especially young people. Studies confirm that participants are likely to respond through the Internet mode rather than to a paper-and-pencil survey. The 56,545 college student responses from the National Survey of Student Engagement, for example, examined whether individuals respond differently to a survey administered via the Internet or via the traditional paper method. A supplementary analysis of one hundred and one students who completed both the Internet and paper surveys, indicated that almost 90 per cent of students at a statistically significant level favoured the web-based survey over the paper-and-pencil type (Carini et al., 2003).

In another instance, a survey conducted at Pisa University in Italy with approximately 18,000 graduates from 1998 to 2002, in offering the two survey formats, showed that a higher education population prefers to respond to a web-based survey rather than a paper-based one (Romano & Himmelmann, 2002). Pandi (2002) also indicated the experience of conducting a survey in Malaysia offering both the traditional paper mode survey and electronic mode survey on the Internet. The web-based survey gathered a better response rate to the conventional survey (Pandi, 2002).

On the other hand, the self-administered survey on a topic of general relevance for a sample of middle and senior managers gained an overall low response rate (Griffis et al., 2003). It was revealed that an email survey gained 14.3 per cent, a response rate higher than the paper-based which gain 10.0 per cent (Griffis et al., 2003) although both response rates were low. It might be because participants who connect from office seem to respond later than others since business people are not interested in completing on-line surveys (Biffignandi et al., 2002).

The Internet-based survey using email as a correspondence instrument with pre-notification and with three replacement questionnaires achieves the same response rate (58 %) as a paper-based survey via mail with a four-contact strategy (Schaefer & Dillman, 1998). The combination of pre-notice and post-notice techniques by email increase the response rate from 40 per cent to 63 per cent (Mehta and Sivadas (1995) as cited in (Dommeyer & Moriarty, 2000). Pre-notification for an email survey impacts on the response rate (Cook et al., (2000) as cited in Shannon & Bradshaw, (2002)). Firstly, it indicates the undeliverable email account (Shannon & Bradshaw, 2002). Secondly, it informs participants that the questionnaire sent via email is not a spam email because people have become annoyed with unsolicited email (Mehta & Sivadas (1995) as cited in Shannon & Bradshaw, (2002); Sheehan, (2001); Sheehan & Hoy, (1999)).

Mail surveys gained a higher response rates of 46 per cent in 1998 and 65.6 per cent in 1995 but email surveys gained 19.1 per cent rate in 1998 and 52.5 per cent in 1995 when conducting a survey with business school deans and division chairpersons (Bachmann et al., 2000). Even though this group is well educated and the age is about 45-60 years old, however the problem with this survey was the high non-deliverable rate, which was about 20 per cent in both years and only 0.4 per cent of non-deliverable mail (Bachmann et al., 2000).

The delivery of an email instrument may be more problematic than a mailed instrument. This impacts on response rates in a survey of employees in U.S. Statistical Agencies - higher response rates were obtained from mail (72 %) than from email (50 %) (Couper et al., 1999). One of the technical problems is a lot of emails are created and randomized automatically to employees who have official email addresses. Even though the emails have been checked, however, this list may include employees who do not use email regularly. Couper et al (1999) conducted a survey in five agencies using their systematic email address lists. They intended to send questionnaires via email; however, two out of five agencies received only the attachment but without details on how to deal with them.

The survey in 1995 at the Chinese University in Hong Kong revealed that the mail survey gained a response rate of 27 per cent which is higher than six per cent in the email survey (Tse, Tse, Yin, Ting, Yi, Yee and Hong, (1995) as cited in Carbonaro,

Bainbridge, & Wolodko, (2002)). It was suggested in the study that the low response rate to this email survey occurred because a cultural preference for paper-based arose from unfamiliarity with web technology and the Internet.

Another factor limiting the chances of answering an Internet-based survey is the ease of deleting or replying to the email questionnaire as well as clicking close on the window of a web-based survey whereas with a paper-based survey as the hard copy people can decide to respond to it later (Carbonaro et al., 2002; Zucker & Eaton, 2006). Notably, the research surveys conducted before 2000 gained better response rates from mail rather than email. This might be due to increased use of the Internet and new web technology in the delivery of questionnaires (Manfreda & Vehovar, 2002a).

2.7.4. Quality of responses and human-error reduction

The factors influencing web-based survey response quality are related to features of participants' Internet usage: their level of knowledge and comfort with Internet usage and, secondly, place of connection (e.g. home or office) (Biffignandi et al., 2002). Based on the results of conducting surveys which offer options for completing a survey by pencil-and-paper or electronic mode on the Internet, the web-based survey has fewer missing values than the conventional survey because the survey application has the ability of checking errors (Haraldsen, Dale, Dalheim, & Stromme, 2002). In comparison to numbers of words, characters, unique concepts and sentences per response, the web environment clearly surpassed the paper-pencil method (MacElroy, Mikucki, & McDowell, 2002).

In the Norwegian census in 2001, in which more than 200,000 people chose to respond to the web-based survey, the quality of the web-based survey results was better than the quality of paper-based surveys (Haraldsen et al., 2002). This finding was replicated in a survey of criminal justice processes with students at New Mexico State University, which had 231 respondents, 50 of whom completed a web-based survey while the rest completed the paper-based version (Mentor, 2002). This is because the Internet-based survey has a consistency check to remind respondents when they skip questions (Haraldsen et al., 2002).

Importantly, Internet users give longer answers to open-ended questions than do respondents in other kinds of self-administered survey (Paolo, et al., (2000) as cited in Sheehan, (2001)). The reason for this is that the Internet community is skewed towards persons who are well-educated (Eaton, 1997). The results of surveys with USA business school deans and division chairpersons support this argument since both the 1995 and 1998 surveys reveal that recipients were much more likely to respond to open-ended questions through email survey (Bachmann et al., 2000). This issue becomes more important to survey research since the open-ended answer can be used to gather information on topics not adaptable to multiple-choice format (Bachmann et al., 2000).

2.7.5. Multimedia and interactive technology requirement

The use of multimedia and interactive technology in self-administered surveys is necessary in terms of improving the quality of completion of the questionnaire and increasing motivation. The Internet surveys can easily meet the requirements of showing a video, audio and even photos (Lovelock, 2003; Zucker & Eaton, 2006), animation and graphics (MacElroy, 1999). The limitations of a paper-based questionnaire flow from its ability in presenting only visual items (Zucker & Eaton, 2006) and its impossibility in using interactive options. In comparison to web-based questionnaires and email surveys, the web-based surveys have lesser limitation in using colours, fonts and other formatting options, which is impossible in most surveys embedded in email (Zucker & Eaton, 2006). In addition, web-based questionnaires organize script to generate, order and number questions logically (Zucker & Eaton, 2006).

2.7.6. Sensitivity level of topics

Self-administered questionnaires, which use scaled questions, can be a good tool for sensitive topics because participants may feel uncomfortable speaking to an interviewer (Dalton, 2004; Lovelock, 2003). The results from any questionnaire asking sensitive questions provide more accurate data than telephone interviews or face-to-face interview (pearsonncs.com, 1996). Internet responses to open ended questions were richer and more honest of feedback (Grandcolas, Rettie, & Marusenko, 2003). This might be because the researcher does not exercise any influence over the respondent by their presence with verbal and non-verbal cues

(Zucker & Eaton, 2006). Internet users' behaviour differs significantly from actual behaviour because of environmental factors (Joinson, 2003b). People reported lower social anxiety and social desirability when using the Internet compared to when using paper-based methods (Joinson, 2003b). Additionally, the study of UK drivers about the usage of mobiles whilst driving reveals using two techniques: Random Web Interviewing (RAWI) and Computer Assisted Personal Interviewing (CAPI) reveals that the anonymous environment on the Internet influences participants in terms of expressing more honest answers, particularly teenagers' responding to sensitive subjects (Comley, 2003).

2.7.7. Population accessibility

The issue concerned on all types of survey is the representativeness in sampling the target population. The problem of choosing a sample for a web-based survey is similar to the infant period of telephone surveys (Nicolini & Presti, 2002) because the surveyor can usually communicate to only a part of the population, not the whole. However, in the future, whenever the amount of Internet users is nearly the same as telephone users, the sampling problem will be reduced (Nicolini & Presti, 2002). Depending on the population, that time may be some time off, especially in developing countries.

In 2004, for example, the numbers of people who use the Internet are only a part of the whole population which needs to be surveyed. It was highlighted when comparing the survey delivery modes - people have addresses and telephone numbers which they use for sending a paper-based questionnaire or contact for interviewing. However, people are overwhelmed by unwanted letters and phone calls. In the USA, for example, there are more than sixty million households on a "do not call" list (Lovelock, 2003). The Internet survey is promising as a future research instrument due to asynchronous service available 24 hours seven days a week. The response quality of Internet surveys reveals more predictive validity than a random-digit-dial telephone survey in a large-scale national survey in Ohio (LinChiat, 2001).

The only groups of populations who access the Internet almost 100 per cent are students and staff in universities, government employees, people whose work relates to network and ICT, and populations who participate in on-line romance and dating (The University of Texas at Austin, 2004b; Forsman & Varedian, 2002). Due to rapid

response time, convenient to complete and return, many students particularly like computer-based surveys (Rice, 2002). Comparing of respondents using Internet-based surveys and telephone surveys show that the Internet user profile is younger, male and more educated (Diane, 1999). Therefore, academic surveys, surveys for business-to-business involving high technology or telecommunications companies, and international employee attitudinal surveys are most suitable for gathering data via the Internet (Stewart & Yalonis, 2001; Zucker & Eaton, 2006). For example, Internet users closely match the USA population because 70 per cent of American adults have Internet access (Stewart & Yalonis, 2001). The issues of representativeness become less and less of a concern because the oldest age range (over 65) and very low income range (under US\$10,000) are underrepresented on the Internet (Stewart & Yalonis, 2001). But it is still a concern. Surveys conducted with a sample of a population who access the Net do not have bias and nor are sampling errors created (Zucker & Eaton, 2006).

There are, nonetheless, some limitations in conducting Internet-based surveys. The first limitation, which occurs on every mode of Internet surveys, is that the Internet does not provide universal coverage since Internet users are currently only a part of the whole population in many countries (Dommeyer & Moriarty, 2000; Nicolini & Presti, 2002; Zucker & Eaton, 2006). Even the demographic characteristics of Internet users may not match the population to be studied (Dommeyer & Moriarty, 2000; Zucker & Eaton, 2006). It is acceptable that the results from a survey gathered on the Internet cannot be inferred to a whole population of any country, and much less for countries in the developing world, even though it has the same characteristics frame. In as much as the results are gathered on a web site, it is only information about people who visited the web site.

In practice, some populations in developing countries still have restriction of access to the Internet. This trend has occurred in Thailand as reported by NECTEC (2003) that three fifths approximately of Thai on-line users are university graduates and living in urban areas. Therefore, Internet-based surveys work best for surveys conducted with populations made of entirely or almost entirely of Internet users (Zucker & Eaton, 2006). Therefore, the Internet-based survey is suitable as an option in mixed-mode surveys, especially national surveys used on a general topic (McMahon et al., 2003).

2.7.8. Concluding observations

The comparison and contrast of these eight issues have shown that Internet-based surveys are more adaptable and flexible than paper-based surveys. The analysis of factors affecting the selecting of survey mode have shown that Internet-based surveys are more effective in terms of speed, budget, response rate, quality of survey, multimedia presentation and sensitive topics. Surveys conducted via the Internet, both email and web-based surveys, have been the fastest methods (Zucker & Eaton, 2006). For large samples, Internet mode surveys have been the least expensive (Zucker & Eaton, 2006). The response rates of Internet-based surveys after 2000 have increased beyond that of the paper-based questionnaire. Recent advances in computer technology have enhanced the quality of survey completion and multimedia presentation in Internet-based surveys that are impossible to achieve through traditional surveys. Computer mode survey, in particular, has been good for gathering sensitive data because people are more likely to disclose themselves (Zucker & Eaton, 2006).

Results from Internet mode surveys however are, at least at this point in time, not based on universally valid samples even though Internet users in US closely match the US population characteristics (Stewart & Yalonis, 2001). It is possible, if not probable, that Internet-based surveys will be increasingly used in the near future but are unlikely to entirely replace traditional surveys (Schonlau et al., 2001). Especially will it provide research opportunities with well-educated populations, people whose work is related to the Internet and populations who can easily access or use the Internet frequently, such as university students (Mentor, 2002).

2.8. Respondents and survey response

The fundamental factors impacting on traditional survey response are based on survey administration, which includes survey format, respondents' behaviour and questionnaire topics (Dillman, 2000). The following discussion relates only to the objectives of this current study, and therefore, it is a study of the factors affecting an Internet-based survey response rate.

To achieve a high response rate and minimise inaccurate and inadequate answers, the researcher needs to understand why people do or do not respond to surveys (Dillman, 2000). The studies relating to factors which influence survey responses have been

organized into five subsections: 1) factors affecting respondents' choice of survey mode, 2) behaviour decision-making model, 3) cultural influences impacting on survey responding, 4) social exchange theory and 5) respondents' behaviour in web-based survey.

2.8.1. Factors in respondents' choice of survey mode

The factors affecting how respondents choose a particular survey mode need to be discussed prior to other relevant issues since it is the first decision that people make in selecting a particular mode. The two main modes of a self-administered survey, paper-based and Internet-based, will be contrasted systematically in this section.

Haraldsen et al. (2002) have presented a model to describe the factors affecting an Internet-formatted response when participants have the option to choose, as Norwegians did for their 2001 census (see Figure: 2.1.) The Norwegian 2001 census form is a paper-based self-administered questionnaire that was sent to every family in Norway, which included the option to respond via the Internet (Haraldsen et al., 2002). However, only almost 10 per cent of census respondents chose the on-line option, even though 60 per cent of Norwegians have access to the Internet from home (Haraldsen et al., 2002).

Figure 2.1.: Haraldsen's factors impacting on Internet response

$$\frac{\text{Mode of data collection}}{\text{Accessibility}} \times \frac{\text{Motivation}}{\text{Interest}} \times \frac{\text{Preparation}}{\text{Competence}} = \text{Internet Response or Non-response}$$

Haraldsen et al. (2002) indicate that there are three possible aspects namely, accessibility, interest and competence, which influence the respondent's decision to choose the mode of completing the census form via the Internet. In addition, motivation and ability affect people in selecting their mode of response to the survey (Krosnick, (1991) as cited in Haraldsen et al., (2002)). "Ability" is a crucial issue, since it relates to the task difficulty of understanding and answering questions (Krosnick, (1991) as cited in Haraldsen et al., (2002)). The recruitment technique is affected by only three factors, namely motivation, interest and competence to complete the survey form (Haraldsen et al., 2002). For example, the paper-based surveys that were posted and offered the option to complete the form on the Internet gained only small numbers of respondents. Because most people who filled out open-

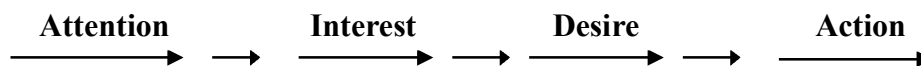
ended questions asking why they completed the paper-based form instead of its Internet-based counterpart indicated that it was more convenient and easier (Haraldsen et al., 2002). This evidence is possible in other studies, and will be happening in future censuses since not everyone in the population has equal access to the Internet. In responding to self-administered surveys either on paper or by computer, participants need to be competent in reading and writing; moreover, with the Internet-based survey, people need to have more facilities, including at least a computer that is connected to the Internet, and they also need to possess some basic Internet literacy (websurveyor.com, 2004b).

2.8.2. Behaviour decision-making model

It is necessary for survey researchers to understand the processes of making the decision to respond to a self-administered questionnaire since they are conducted without interviewers. This subsection presents a model from a study of the determinants of mail-survey response, focussed on two factors: survey design and the decision process of respondents (Helgeson, Voss, & Terpening, 2002). Due to the similarity between paper-based and web-based questionnaires, this model might be applied to a behaviour decision-making model on Internet-based surveys. The model has been developed from a basic hierarchy-of-effects model that is called the “AIDA” model (see Figure 2.2.).

Figure 2.2.: A basic hierarchy-of-effect model

Source: Helgeson et al., (2002)



Both the AIDA model and the survey response model are examining persuasion processes (Helgeson et al., 2002). The role of a survey researcher is to encourage and trigger the respondents to move towards each subsequent decision until the desired behaviour has been performed (Helgeson et al., 2002). It outlines the basic steps in survey response, commencing with mental activity in the pre-behaviour stages followed by the transit towards the physical activity of actually responding as required in the behaviour stages (Helgeson et al., 2002) (see Figure 2.3.).

Figure 2.3.: A basic step of survey response

Source: Helgeson et al., (2002)

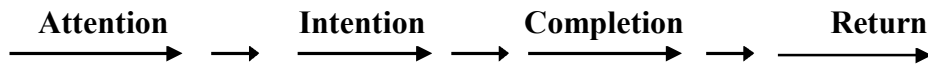
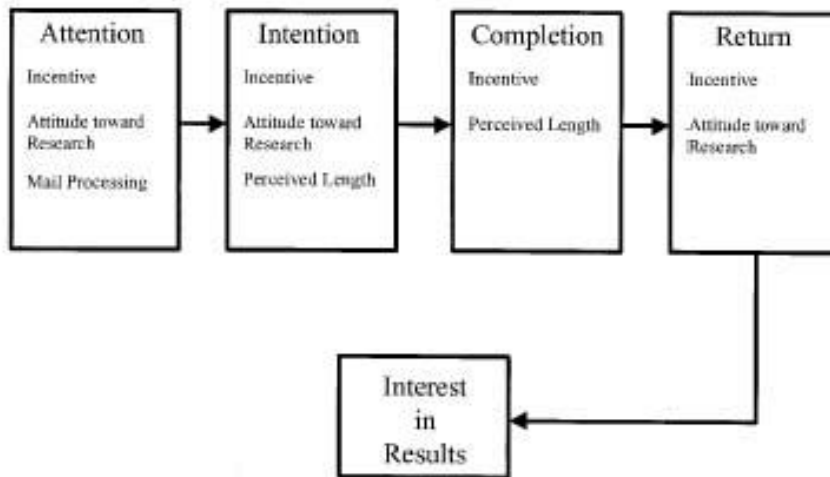


Figure 2.3. suggests that each of the basic steps in survey response has a significant relationship to the next phase in the decision process. The behavioural stages, which include completion plus return, are the most difficult and important steps since both require people to do physical activities, namely read, write responses, put the questionnaire back into an envelope and return by post. On the other hand, the activity of returning the Internet-based questionnaire has fewer requirements than the traditional survey since one need only press the “submit” button on the web page. Researchers need to consider the techniques to move respondents through to the next phase of the decision process and encourage respondents through to the end of the process.

A model of the basic steps in survey response (Figure 2.3.) by Helgeson et al. (2002) was revised after an experimental study (Figure 2.4.) showed the factors in each phase or step.

Figure 2.4.: Survey-response hierarchy-of-effects model

Source: Helgeson et al., 2002, p. 321



The results of this study did not indicate whether design factors such as personalization, type of stamp and paper colour increased attention and whether they had any significant impact on response rate (Helgeson et al., 2002). The only significant factor was the incentive, which impacts on every phase of the survey-completion decision process. However, incentives are “inherently behaviour-modification devices” (Helgeson et al., 2002). The result of an experimental study of an Internet-based survey that recruited both undergraduates and nonstudent participants indicated that financial incentives do not influence the rate of non-response errors (O’Neil & Penrod, 2001). Moreover, it was suggested that the possible maximisation of the postal survey response rate is based on the attitudes and perceptions of respondents because attitudes toward research determine attention, intention, completion and return (Helgeson et al., 2002). Conversely, offering incentives and a pre-notice approach can reduce the rate of attrition (Manfreda & Vehovar, 2002b). A lottery ticket seems to be the most efficient incentive in terms of response rate and cost effectiveness (Deutskens, Ruyter, Wetzels, & Oosterveld, Feb 2004). Additionally, offering respondents a prize draw and the possibility of winning nothing obtained the same response rate (Cobanoglu & Cobanoglu, 2003). In academic research, the best incentive might be a free interesting report of the findings that is useful for participants (Lang, 2005).

2.8.3. Cultural influences on survey responding

Theories as to why people respond to surveys can be divided into two main approaches: cognitive psychological and cultural background approaches. The cognitive psychology approach was brought back into survey methodology during the 1980s and 1990s (Krosnick & Alwin, 1987; Schuman & Presser, 1981; Schwarz & Sudman, 1992; Tourangeau, Rips, & Rasinski, 2000). Cognitive theory has been used to understand respondents' behaviour as mentioned in the previous section; however, Dillman (2002) argues it is not only cognition but also cultural influences that influence response rates to self-administered questionnaires. The language used in self-administered questionnaires comprises verbal language for instance, wording; and non-verbal language such as number, symbol and graphic features (Redline, Dillman, Dajani, & Scaggs, 2002). Figure 2.5. displays a model of how cognition, language and culture influence response rates to self-administered questionnaires (Dillman, 2002).

Figure 2.5.: A model of factors influence responses to questionnaires

Source: Dillman, 2002, p.40

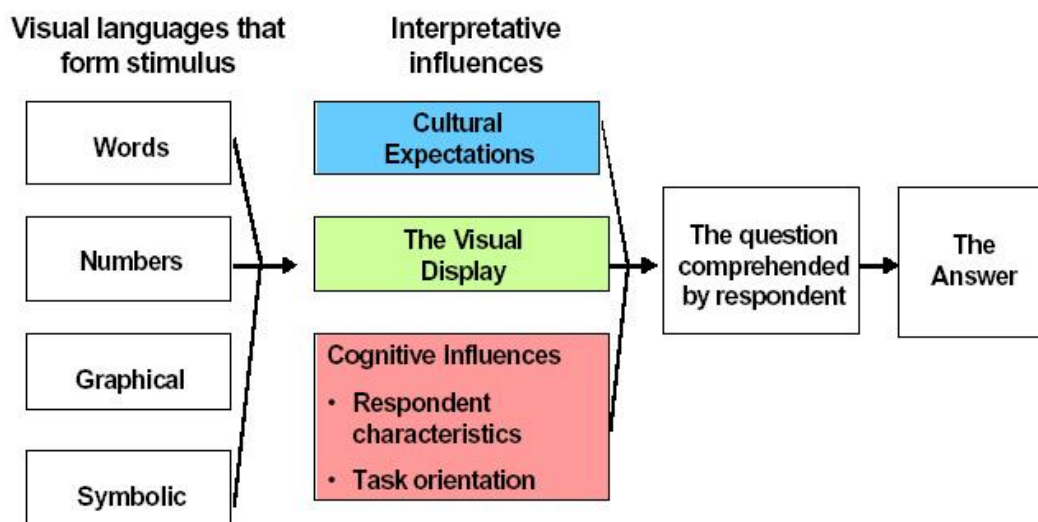


Figure 2.5. reveals the four steps of the survey response process: 1) the design of the survey form, 2) interpretative influences, 3) level of comprehension and 4) the result. The self-administered surveys, both mail and other methods, are producing a significant cultural change (Dillman, 1999).

In practice, the administration of questionnaires includes complex processes that researchers attempt to utilise to gain better response rates. The tailored design is “the development of survey procedures that create respondent trust and perceptions of increased rewards and reduced cost of being a respondent, which take into account features of the survey situation and have as their goal the overall reduction of survey error” (Dillman, 2000, p.27). The basic rules for designing a quality self-administered survey in achieving satisfactory response rates include two main parts (Dillman, 2000):

- 1) The actual act of responding involves cognition and motivational factors
- 2) Multiple attempts become crucial for all kinds of self-administered surveys.

The first part, *cognition*, is the most fundamental because people need to inform themselves in order to understand what the survey wants them to do (Dillman, 2000). The four-step cognition model includes comprehension, retrieval, deciding and reporting (Tourangeau and Rasinski, (1988) as cited in Dillman, (2000)). However, additional motivation is an important cause in driving the process of answering and returning questionnaires (Dillman, 2000).

Secondly, the significance of multiple attempts to reach potential respondents might increase opportunities in encouraging a cognitive understanding of what is being requested (Dillman, 2000). It focused on social exchange theory and respondent behaviour because “social exchange theory is a helpful guide for organizing and presenting a sequence of mutually supportive requests to questionnaire recipients” (Dillman, 2000, p.14).

2.8.4. Social exchange theory

“Social exchange is a theory of human behaviour used to explain the development and continuation of human interaction.” (Dillman, 2000, p.14). Social exchange is a broader concept than economic exchange, in which using money serves as a precise measure of the worth of a person’s actions (Dillman, 2000). Social exchange includes three elements of action: rewards, costs and trust (Dillman, 2000, p.14)

“...*rewards* are what one expects to gain from a particular activity, *costs* are what one gives up or spends to obtain the rewards, *trust* is the

expectation that in the long run the rewards of doing something will outweigh the costs.”

The theory of social exchange implies three questions about the design of the questionnaire and the implementation process (Dillman, 2000):

- How can a researcher increase the rewards for responding?
- How can perceived costs be reduced?
- How can trust be established so that the ultimate rewards will outweigh the costs of responding?

The response rates will be increased when “the respondent *trusts* that the expected *rewards* if responded will outweigh the anticipated *costs*” (Dillman, 2000, p.27).

Dillman (2000) and Jennifer (2006) indicate many aspects, which can be established through trust and affects the respondent’s expectations for rewards and costs as described below.

2.8.4.1. Ways of establishing trust

The following outlines are details of how the survey researcher can establish trust toward respondents in the self-administered survey (Dillman, 2000).

Providing a token of appreciation in advance. Even though it involves only a small amount of money or some small gift of little value for participants, it seems to have greater value in creating trust (Dillman, 2000). It needs the explanation that the money is a “small token of appreciation”, not a “payment for your time” because otherwise it is likely to be demeaning and insulting (Dillman, 2000). Considerably, response rates of surveys can increase by offering incentives and small gifts (Jensen, 2006).

However, this current study will not provide any money or any other incentive for participants.

Informing time of taking the survey. The survey should also be truthful about time, when it is only a short survey ‘emphasise’ that, most respondents prefer to know how much time for taking the questionnaire (Jensen, 2006). Thus, the current study used this strategy by indicate the estimate time of filling the online form before start the survey.

Sponsoring by legitimate authority. The research studies have shown that surveys sponsored by authoritative sources achieve higher response rates than when from government, business and individuals (Dillman, 2000, p.20). This is because the social relationship between researcher and respondent is necessarily embedded in cultural values, norms and codes of conduct (Aldridge & Leving, 2001). Therefore, the researcher agreed to use this strategy by publishing the name of the Computer Centre of a Thai university with the researcher's name as the legitimate authority sponsoring the survey.

Making the task appear important. Using a personalised covering letter on letterhead and designing the form to emphasise that the participants seem important adds to trust (Dillman, 2000). Surveys gain at least five per cent or much higher when sending email with a personal salutation (Jensen, 2006). The cover letter should indicate "Dear Mr. Wright" rather than "Dear Valued Alumni". Accordingly, this current study used the university logo as a part of the graphics.

Invoking other exchange relationships. One of the functions of social exchange is that sometimes people do things for other people because they feel they want to reciprocate a kindness or favour (Dillman, 2000). Moreover, people completed a survey just because would like to share their information than to receive an incentive (Jensen, 2006). Then, in the on-line survey it was mentioned that this project was conducted by both the Computer Centre at the Thai university and the researcher.

2.8.4.2. Ways of providing rewards

The following outlines are details of how the survey researcher provided a reward for respondents in the self-administered survey (Dillman, 2000).

Showing positive regard. This technique that was mentioned at the beginning of the covering letter is by printing a personal address and making statements such as "You have been selected in our survey. Please respond to the enclosed questionnaire" (Dillman, 2000). Additionally, it emphasises that the survey was to be conducted within a set time frame; and there is a toll free number to call if there are any further questions (Dillman, 2000). In terms of self-administration via the Internet, it is better to combine the covering letter and the first page of the survey altogether, since it is very easy to quit or close the web page. Hence, the proposed survey form will indicate

positive regard briefly at the start of the questionnaire. This method provides for using only one decision step in completing the web-based questionnaire.

Saying thank you. On the Internet the “Thank you” can be provided rapidly after users have clicked on the submit button (Dillman, 2000).

Asking for advice. People tend to feel accomplished when their opinions assist others to solve problems (Dillman, 2000). Also it should be emphasised that conducting a survey is the only way to find out about how the service meets audience satisfaction (Dillman, 2000).

Supporting group values. Whether participants can identify with certain groups depends on the surveys (Dillman, 2000). There is a sense of reward for individuals (Dillman, 2000).

Giving tangible rewards. Providing a tangible incentive sent at the time of the first contact has been found effective for response rates (Dillman, 2000). However, this study disregarded any using of such incentives.

Being clear about privacy protections. The concept of ‘the information society’ causes concern among people concerned about commercialization of data when giving the contact information to the organizations (Aldridge & Leving, 2001). On the cover letter, the researcher should at least inform respondents how the information will be used. Jennifer (2006) indicated that the participants are more comfortable sharing information on the Internet when the survey guarantees anonymity and confidentiality.

Making the questionnaire interesting. There are many aspects involved in gaining and sustaining interest in a questionnaire: topic, layout design and ordering questions respectively (Dillman, 2000). The highly salient topics usually obtain a higher response rate than low salient topics (Dillman, 2000). It is very important to commence with interesting questions to grasp people’s attention (Dillman, 2000).

Giving social validation. It is suggested that participants should be informed that there are others like themselves who wish to respond to this survey (Dillman, 2000). This is because participants see themselves as similar to most others in a socially validated

group (Dillman, 2000). This technique can be provided in the web-based survey by creating the link to the information of how many people have responded to the survey so far and identify participants into each group such as university students from which faculty, staff and so on.

Informing respondents that opportunities to respond are scarce. Informing people that there are relatively few opportunities to respond, the opportunities are limited, and then they should respond quickly by using deadline dates is also a useful mechanism (Dillman, 2000).

2.8.4.3. Ways of reducing social costs

The following outlines detail how the survey researcher is able to reduce social costs toward respondents in the self-administered survey (Dillman, 2000).

Avoiding subordinating language and design. Formal language is more effective than informal (Dillman, 2000). Not only does the language affect respondents' decision to participate in the survey but also the design does. Online respondents prefer short and simple design, for example, most people do not read extensive instructions (Jensen, 2006).

Avoiding embarrassment. People will not respond to a topic because of their lack of knowledge (Dillman, 2000). The researcher should know the character of respondents and tailor an appropriate survey for them. The survey should convince people that their value of respondents' contribution is important (Aldridge & Leving, 2001).

Avoiding inconvenience. Posted questionnaires need to provide a return envelope with stamp, either a real stamp or a business reply envelope (Dillman, 2000). On the other hand, surveys conducted on the Internet provide the "submit" button and avoid the "reset" button, which clears all data. Additionally, the very long on-line survey should provide the application backend to save the answers which the respondents have chosen, because people perhaps do not have time to complete the whole survey in one setting. Users can login to continue their response to the survey the next time that they access the Internet.

Making the questionnaire appear short and easy. Research indicates that user friendly questionnaires with carefully organized questions in easy-to-answer formats can

improve response rates (Dillman, 2000). This issue deals with both the verbal and non-verbal language used in the web-based survey, which will be discussed in detail in chapter three.

Minimising requests to obtain personal information. When surveys require personal details such as past sexual behaviour or use of drugs, because this is the main objective of the survey, a researcher should explain the importance of such questions and guarantee both confidentiality and anonymity and use subtle words in the questions (Dillman, 2000). For example, in the web-based questionnaires, instead of asking personal email address only, it should explain that leaving email addresses is an option for users who wish to know the results of the survey.

Keeping requests similar to other requests to which a person has already responded. People will perform a larger task if they are first engaged in a small but stimulating task that leads into a greater time commitment (Dillman, 2000). This technique will be useful for Internet-based surveys by using multiple-pages rather than all the questions on one page.

2.8.5. Respondents' behaviour in web-based survey

The screen-by-screen, web-based survey format technology has been used as an instrument to study how Internet users behave in responding to the on-line questionnaire. The behaviour of respondents to web-based surveys has been studied in non-restricted web-based surveys, with the survey topic "the roles of men and women in family and work life." The invitation method was an advertisement placed on search engines and portal web sites such as Yahoo, Altavista, etc. The study of respondent behaviour can be captured under three conditions (Bosnjak & Tuten, 2001):

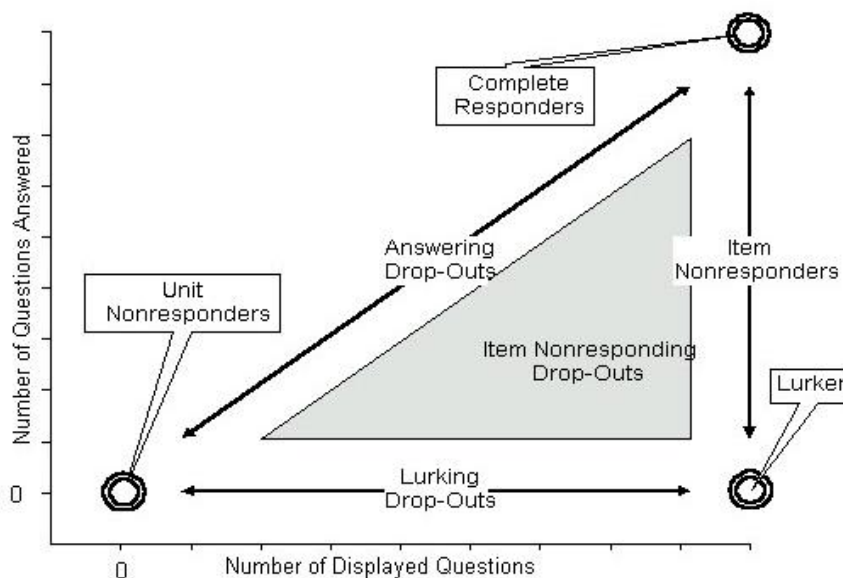
1. each question must be displayed separately (screen-by-screen design),
2. participants are not forced to provide an answer before being allowed to move on (non-restricted design),
3. each page of the questionnaire must be downloaded separately from the server, and should not be allowed to reside in the web browser's cache.

A typology of non-response patterns of web-based surveys is divided into seven types and given selected titles (Bosnjak & Tuten, 2001):

- a) *Complete responders*: Respondents, who give completed answers, also infer that that they have read all questions.
- b) *Unit non-responders*: Respondents who do not give any answer and do not view the survey. They are participants who withdraw after the welcome screen is displayed.
- c) *Answering drop-outs*: Respondents who answer some questions then quit prior to completing the survey.
- d) *Lurker*: Lurking respondents are participants who view all of the questions in the survey, but do not answer any of the questions.
- e) *Lurking drop-outs*: Lurking respondents are those who exit the survey after reading some questions and giving no answers.
- f) *Item non-responders*: Respondents who view the entire questionnaire, but only answer some of the questions.
- g) *Item-non-responding drop-outs*: Respondents who combine segments c) and f) - they are individuals who view some of the questions, answer some but not all of the questions viewed, and also quit prior to the end of the survey.

Figure 2.6.: Types of respondents in web-based survey

Source: Bosnjak & Tuten, (2001)



The pattern of respondent behaviour in web-based surveys is illustrated in Figure 2.6. The largest group are respondents who view the whole questionnaire but give only some answers - that is, 36 per cent of total respondents. There were 1,469 people

(25.3 %) who completed this survey, 35.4 per cent male and 64.6 per cent female. 13.3 per cent of the participants exited the survey after reading some questions and giving no answers. There were 10.2 per cent of participants who quit the survey from the welcome page. There were 6.9 per cent of the respondents lurking while 4.3 per cent were those who answered some questions, then quit prior to completing the survey and four per cent were respondents who completed some, but not all, questions (Bosnjak & Tuten, 2001).

In conclusion, accessibility, interest and competence are the main issues affecting respondents' decision to complete the on-line questionnaire (Haraldsen et al., 2002). Participants need to have more facilities, including at least a computer, connected to the Internet and they also need to possess Internet literacy when completing a questionnaire on the Internet. The incentive is the only significant factor, which impacts on every phase of the survey-completion decision-making model (Helgeson et al., 2002). Additionally, the possible maximisation of the response rate is based on the attitudes and perceptions of respondents because attitudes toward research determine attention, intention, completion and return (Helgeson et al., 2002). Cultural expectation influences survey response at the interpretive influence phase. The response rates will be increased when "the respondent trusts that the expected rewards of responding will outweigh the anticipated costs" (Dillman, 2000 p.27). According to the previous information of Section 2.8.5., the research project by Bosnjak & Tuten (2001) that focused on users' behaviour on web-based survey (n ~ 5,806), the largest group of Internet-based survey respondents (one third approximately of total respondents) are users who viewed the whole questionnaire but failed to answer one or more questions.

2.9. Survey validity

Survey accuracy and validity is affected by several potential sources of errors: coverage errors, sampling errors, non-response errors and measurement errors (Arsham, 2004; Dillman, 2000; Schonlau et al., 2001; Stoop, Jowell, & Mohler, 2002). The first three errors are related to sampling techniques. Therefore, there must be defined the different population types whose meaning is as follows (Groves (1989) as cited in Scholau, 2001, p.13):

- 1) The *population of inference* is the population about which the researcher ultimately intends to draw conclusions.
- 2) The *target population* is the population of inference minus various groups that the researcher has chosen to disregard.
- 3) The *frame population* is that portion of the target population that can be enumerated via a sampling frame.
- 4) The *survey sample* consists of those members of the sampling frame who were chosen to be surveyed.

The quality survey design aims to reduce all types of possible errors (Dillman, 2000; Schonlau et al., 2001; Stoop et al., 2002). Different types of survey errors outlined below will define the meaning of population types.

2.9.1. Coverage errors

Coverage errors occur when all members of the survey population have not an equal chance to be participants (Couper, 2000; Dillman, 2000; Schonlau et al., 2001; Stoop et al., 2002). Coverage error is the statistical amount of diversity between the frame population and the target population (Burkey & Kuechler, 2003; Couper, 2000; Schonlau et al., 2001).

For example, in conducting telephone interviews such as by random digital dialling with a population of which only about 50 per cent have access to a phone, the study will be affected by coverage errors (Schonlau et al., 2001). The similar trend of coverage errors occurs on self-administered questionnaires on the Internet with the population who are not computer literate and can not access the Net (Burkey & Kuechler, 2003). The Internet population will become universal when almost the whole population of a society has access to the Internet.

The other example, coverage errors of Internet-based surveys, occurs when a sample comprises Internet users who visit the particular web sites. The coverage error can occur when the web-based surveys that use an advertising banner or the pop-up windows to invite users, but the regular visitor lacks access to the particular web page during the conduct of the on-line survey. The solution for coverage errors in an Internet-based survey could be through pre-notification before survey

commencement, a sufficiently long enough period for conducting the survey or administering the regular survey annually at a precise time.

To reduce the coverage errors, the first approach is to obtain as complete a sampling frame as possible by using a dual-mode of contacting and responding (Dillman, 2000). The second approach is to implement a post-stratifying mechanism to weight the survey sample to match some characteristics of the population (Schonlau et al., 2001).

2.9.2. Sampling errors

Sampling errors occur when only a subset of the target population is selected but the results are inferred to the whole population (Couper, 2000; Dillman, 2000; Schonlau et al., 2001; Stoop et al., 2002). Sampling error issues are the general shortcoming of Internet-based survey and conventional surveys - this is because sampling errors happen in any survey which cannot create a sampling frame due to high cost or difficulty (Schonlau et al., 2001). In reality, the web-based survey faces practical difficulty in obtaining a random sample due to the difficulty of determining the size of the population (Lang, 2005). Moreover, frequently the researcher may not exactly know the population size which is not a problem because “The mathematics of probability proves the size of the population is irrelevant” (Zucker & Eaton, 2005, p.9). Nevertheless, the researcher also needs to consider convenience sampling that frequently causes sampling errors which develop from the uncertainty in the sample statistic (Schonlau et al., 2001). The components of uncertainty are variance and bias (Grove, (1989) cited in Schonlau et al., 2001, p.15).

Groves (1989) stated that *variance* characterizes the variability in the sample statistic that arises from the heterogeneity on the survey measure (or estimate) among the population. In other words, variance characterizes the variability of an estimate that stems from the fact that drawing a different sample will result in a different estimate. Bias, on the other hand, is the systematic difference between the sample statistic and the actual population parameter of interest.

The sampling errors can be prevented by using probabilistic sampling mechanisms such as estimates that are improved by larger sample sizes or minimising non-

response through various mechanisms (Schonlau et al., 2001). The sampling bias can be controlled for in the web-based survey conducted in an organization related to IT that allows and enforces employees to complete a questionnaire in the workplace because each member has an equal right to be a participant (Burkey & Kuechler, 2003). Furthermore, in a small organization, surveying every member eliminates most or all sampling error (Burkey & Kuechler, 2003).

Survey accuracy also depends upon the sample size as a proportion of the overall population (Lang, 2005). A sample size of about ten per cent of the overall population is adequate (Alreck & Settle, (1996) as cited in Lang, (2005)). In addition, according to Dillman (2000, p.207), when the survey accepts a confidence interval level of 95 per cent, sampling error of $\pm 3\%$ and using a yes/no question (50/50 split), a sample size of 1,067 is adequate for an infinite population. If the researcher wants to estimate this characteristic and using a more homogeneous split with the same confidence, then only about 683 is adequate for an infinite population (Dillman, 2000). The other situation, when the survey accepts a confidence interval level of 99 per cent, sampling error of $\pm 3\%$ and using a yes/no question (50/50 split), a sample size of 1,848 is adequate for an infinite population (Davis, Davis, Davis, & Davis, 2005; Zucker & Eaton, 2005). It should be noted that the confidence interval calculations are efficient only when it is a random sample of the relevant population (Zucker & Eaton, 2005).

2.9.3. Non-response errors

Non-response errors occur when the information of non-respondents is likely to be different from respondents in a way relevant to the survey's objective (Couper, 2000; Dillman, 2000; Schonlau et al., 2001; Stoop et al., 2002; Waksberg, 2005e). Most surveys encounter non-response errors due to refusing participation (Waksberg, 2005e). There are two types of non-response behaviour: unit non-response and item non-response (Burkey & Kuechler, 2003). Burkey & Kuechler (2003) define 'unit non-response' as a respondent failing to participate in a survey, and 'item non-response' as a respondent failing to answer one or more questions in the survey. Biases in the survey results are due to the presence of non-response errors that makes the sample less representative of the population (Waksberg, 2005e).

To reduce non-response errors, researchers need to plan for increasing the initial response rate by offering incentive and reducing attrition by asking private and

personal information (O'Neil & Penrod, 2001). Then, the initial page needs to motivate people in order to invite participation in the survey by giving a good explanation before commencing the survey instrument with interesting or easy questions (Burkey & Kuechler, 2003). Furthermore, a survey requiring email address and other personal information such as name and ID number may cause participants to depart the questionnaire and reduce motivation to respond (O'Neil & Penrod, 2001).

Non-response errors can be generated at any stage of the decisions in designing and conducting a survey. For example, offensive wording, confusing format, lack of anonymity or poor server performance can cause participants to refuse to respond to the survey (Burkey & Kuechler, 2003). The other important factors that influence non-response errors when conducting web-based surveys are ease of use and time required to complete due to the ease of closing the web page (Burkey & Kuechler, 2003). Moreover, the mode of data collection might mitigate or exacerbate the non-response errors (Schonlau et al., 2001). Another example from America is over-representation in surveys of the general public by females because women are usually more likely to participate than men (Waksberg, 2005e). Computer-assisted questionnaire administration technology can reduce this problem by determining how the sample control fits the quota requirements as mentioned earlier.

2.9.4. Measurement errors

Measurement errors occur when participants give a wrong answer because of misinterpretation or mis-presentation of a question (Couper, 2000; Dillman, 2000; Lang, 2005; Manfreda et al., 2002; Schonlau et al., 2001; Stoop et al., 2002; Waksberg, 2005c). Measurement errors are of most concern in this current study because of its relevance to development of questionnaire form design. In the design of interface instruments such as a response scale, the ordering of the items or the positioning of the options and the instructions for conditional questions increase response bias (Burkey & Kuechler, 2003).

Measurement errors are also increased by inattention, refusals to answer and incomplete answers when participants feel tired from filling out a long questionnaire (Waksberg, 2005d). The recommended guidelines for on-line questionnaires include a conservative format, the use of cascading style sheets instead of excess graphics and avoiding the use of multiple colours (Burkey & Kuechler, 2003; Dillman, 2000). One

way to reduce measurement error from screen configurations is to enforce the consistency of display in different browsers, operating systems and screen resolution settings (Burkey & Kuechler, 2003; O'Neil & Penrod, 2001). Moreover, other environment variables such as time and day of survey completion also can generate measurement errors and influence the results of the study (O'Neil & Penrod, 2001). The result from experimental research that recruited both undergraduates and non-student participants in the USA reveal that on weekends, participants were likely to continue and finish the survey rather on weekdays (O'Neil & Penrod, 2001). In addition, the influence of web-based survey display also affects measurement errors of studies that include tables, colour and also include elements or icons: radio buttons, check boxes and drop-down menu (O'Neil & Penrod, 2001). Therefore, this current study examined the diversity of response rates on weekdays and weekends with users of the Thai university web site. Moreover, the three different icons used on web sites were included to see whether measurement errors are increased.

2.10. Planning surveys

This section outlines the steps in developing a survey to be conducted on-line. In preparing to conduct an effective research survey, it is necessary to understand the sequence of steps even though in the actual implementation each step may overlap with others (Waksberg, 2005d). Following the implementation processes for traditional surveys, most Internet surveys will be conducted with similar planning steps (Schonlau et al., 2001). The basic processes for conducting an Internet-based survey usually include five stages; (Schonlau et al., 2001; Waksberg, 2005d; Zucker & Eaton, 2006)

1. Designing the purposes of the survey
2. Determining survey sampling method
3. Creating and testing the instrument
4. Determining survey interaction
5. Strategy for data collection and analysis.

2.10.1. Designing the purposes of the survey

The first stage in a survey is to design and outline the purposes of the investigation that should be specific, clear-cut, and as unambiguous as possible (Waksberg, 2005d). To define the survey objectives, one should commence at specifying the population of

interest, delineating the type of data to be collected and determining the desired precision of the results (Schonlau et al., 2001).

2.10.2. Determining survey sampling method

Depending on the statistical quality needed for survey findings, the sample size relates to the way of using the results. All surveys will have their own rule for sample size. The factors influencing sample size are time limitation, and professional and financial resources (Waksberg, 2005a; Zucker & Eaton, 2006). To determine a sampling group, the survey researcher needs to decide who and how many will be participants (Zucker & Eaton, 2006), specify the method of sample election as either probability-based or convenience-based, create a sampling frame (if necessary) and select the sample (Schonlau et al., 2001).

Statistical theory and probability theory are fundamental sample randomization (Waksberg, 2005d). The objectives and scope of the survey effect how one chooses a particular type of sample (Waksberg, 2005d). Additionally, the nature of potentially available frames, the overall survey budget, the method of data collection, the subject matter and the kind of respondent needed are factors which influence the sampling frame (Waksberg, 2005d). The sample design will distribute the possibility to all units in the population (Waksberg, 2005d).

In some surveys, the target group are obvious such as employees in an attitude survey in a particular organization, but some surveys have less obvious populations such as customer attitude toward products (Zucker & Eaton, 2006). In order to locate all the members of the samples to have a chance to be sampled, the sampling frame or a list is constructed (Waksberg, 2005d). For example, all the email addresses of university students will be a frame for conducting Internet-based surveys using an email invitation method (Waksberg, 2005d). The sample frame based on geographic areas is a well-design artificial boundary (Waksberg, 2005d). The up-dated list or complete list of a population will ensure adequate coverage of the desired population (Waksberg, 2005d).

2.10.3. Creating and testing the instrument

Questionnaires used in surveys are based on the demand of information and the delivery mode of data collection (Waksberg, 2005b). The American Statistical

Association states that “planning the questionnaire is one of the most critical stages in the survey development process”, (Waksberg, 2005d, p.2). There are issues involved in questionnaire design including delivery modes, concepts, phraseology, length and order (Waksberg, 2005d). In order to design a good question, it is crucial to have the concept clear and the wording understandable (Waksberg, 2005b). Therefore, the stages of creating and testing the instrument include: choosing the response mode such as paper or the Internet, drafting the questions, pre-testing and revising the survey instrument (Schonlau et al., 2001; Waksberg, 2005d).

The common requirements of questionnaire design are well-defined concepts, unambiguous wording, reasonable order and appropriate length (Waksberg, 2005d). Furthermore, to minimize mistakes and biases, a well-designed survey must avoid not only retrospective but also sensitive questions (Waksberg, 2005d). In an expenditure survey, the questionnaire should not ask about events which occurred too long ago (Waksberg, 2005d). Furthermore, the questionnaire asking about unduly sensitive issues should not ask for details that are too personal (Waksberg, 2005d) unless this information is the object of the survey. The language used in a questionnaire for people in the street needs to be simple and written at the fifth grade reading level (Waksberg, 2005c, p. 11).

A credible survey needs to include at least three activities: pre-testing field procedures, following up on non-respondents and adequate quality controls (Waksberg, 2005c). It is crucial to conduct the field questionnaire pre-testing because the results will be used to improve both wording and concepts (Waksberg, 2005c). One of the steps which assists a better response rate is following up non-respondents (Waksberg, 2005c). A big mistake in conducting a field survey is sloppy execution of a survey. An Internet-based survey is a good example of a survey, which can control for adequate quality. The on-line survey using cookies to protect re-submission from the same person will filter the problem of a sloppy questionnaire file (Waksberg, 2005c).

The pre-testing of self-selecting questionnaires is vital for improving quality (Krosnick, 1999). There are eight suggested techniques in order to test or trial questionnaire design: focus groups, cognitive laboratory interviews (think aloud techniques), behaviour coding, respondent debriefings, interviewer debriefings, split-

panel tests, analysis of item non-response rates and analysis of response distributions (Waksberg, 2005c). The pre-testing is divided into two types: pre-field and field (Waksberg, 2005c). The two first techniques, focus groups and cognitive laboratory interview, are pre-field activities since they are conducted during the preliminary stages of questionnaire development. All the other six are field techniques since they are conducted after the design of the instrument.

2.10.4. Determining survey interaction

The three main components of interaction with survey respondents can be divided into: contact, response and follow-up (Schonlau et al., 2001). Contacting respondents throughout the survey process basically includes: pre-notification that the survey is coming, post-delivery reminder and thank-you and non-response follow-up for those who do not return the survey (Schonlau et al., 2001). Conducting the survey interaction method that for participants and the type of information required is the most appropriate positively increases response rates. However, the survey researcher should consider in the budget for the survey both the time and money required due to material costs and labor costs (Waksberg, 2005b). Additionally, the time required conducting the research is based on the survey type and situation (Waksberg, 2005b).

2.10.5. Strategy for data collection and analysis

Data collection and analysis are based on the type of survey such as quantitative and qualitative surveys. Depending on survey objectives, the most appropriate for gathering data will be chosen to generate adequate research results. The analysis to prove any hypothesis of a study also needs to relate the survey results to the hypotheses. There are many appropriate forms for data presentation of the findings of research projects such as a graph, a chart, a table and so on.

2.11. Summary

This chapter on ‘survey design processes’ has explained the essential fundamentals of on-line survey research, especially web-based surveys. From the analysis, a survey is a reliable scientific instrument for collecting data. Even though questionnaires are the same basic instruments used for a census, survey or a poll, the contents of a questionnaire and sample selection methods are basically different. The surveys are categorized into qualitative and quantitative surveys based on the objectives and data collection methods. Internet-based surveys have been classified as self-administered

surveys that require people to fill the electronic form on the Net instead of the traditional mode on paper. Based on recruitment techniques, there are two main types of web-based surveys: non-probability methods and probability methods. The automation of computer technology used in the web-based survey can enhance survey quality and this is a distinctive outcome that can never occur in a paper-and-pencil based survey. Internet-based surveys are superior to paper-based surveys in terms of speed, cost, response rates, quality of responses and human-error reduction, multimedia and interactive technology requirements and sensitivity level of topics. However, an Internet-based survey is a suitable instrument when collecting data with well-educated populations, people whose work is related to the Internet and a population who can easily access or use the Internet frequently, such as university students. To achieve a high response rate and minimise inaccurate and inadequate answers, the researcher needs to understand the factors that influence survey responses such as choice of survey mode, behaviour decision-making and the culture of responding and so on. Furthermore, survey validity has been impacted by four main sources of errors: sample errors, coverage errors, non-response errors and measurement errors. To organize an effective survey, survey planning should commence on designing or outlining the clear purposes of the survey, then determining the sampling method, creating and testing the instrument, determining survey interaction and, lastly, specifying the strategy for data collection and analysis.

CHAPTER THREE

INTERNET-BASED SURVEY DESIGN

Given the aims of this study, it is necessary and worthwhile to gather information about previous Internet-based surveys since their use has been so recent. As well, any available information about the invitation methods deployed to encourage users to participate in an on-line questionnaire also needs to be examined. The meaning of an Internet-based survey as understood for this particular study is a web-based survey displayed on standard browser software.

Writing systems is a major issue in this study and yet all the literature to be quoted in this chapter and successive chapters concern surveys conducted in the English language. Both the Roman script used for English and the Thai script are alphabet written, unlike Arabic, from left-to-right; both are written from top-to-bottom. Thai, a script of 44 consonants, does not distinguish between capital and small letters nor does it use the period or full stop to signal the end of a sentence. In fact, there is no intervening space between words as in English. Vowels are treated differently. There are 15 basic vowel sounds but they are written above, below, before or after the consonant they modify. The vowel characters can be combined with certain consonants to produce diphthongs and triphthongs (Slayden, 2005). There are 32 basic and combined vowels.

Unlike many other languages, there are no tenses, no gender differentiation, no system of pluralization and no definite or indefinite article in Thai, while the rules of politeness are complex, different for such groups as the Royal family and the Buddhist monks and a little different between the genders. The Thai language is a tonal language, having five tones: mid, low, high, rising and falling with a character for each tone except the mid – the tonal system is even more complex than is suggested by this simple explanation. A change currently occurring with implications for web design is that the numerals are now being written in the Arabic script (as in English), not in the Thai script. Another issue is that the Microsoft version of Thai does not always place the vowel superscript in exactly the position it ought to be.

The design guidelines for Internet-based survey instruments have emerged mainly, and not unexpectedly, from a combination of web graphic design and paper-based

survey design. In this chapter, the design of questionnaires will deal with design features of the web site, such as screen layouts, navigation and response items on the on-line form due to the special nature of web-based surveys. Thus, the traditional components of questionnaire design, such as types of questions, wording and ordering will be presented only briefly.

In reference to survey error, it should be noted that this chapter wishes to outline mechanisms for reducing measurement and non-response errors generated inadvertently by the survey instruments. The other two types of survey errors, coverage and sampling errors that arise from other sources are not discussed. Therefore, the main purpose of this chapter is to describe the principles of web-based survey design. Furthermore, it presents different types of invitation methods for web-based surveys. This chapter has been organized into the following five sections.

- Section 3.1: *Web-based questionnaire essentials* – The description of web-based survey overall fundamentals to simulate working processes on the Internet.
- Section 3.2: *Web-based questionnaire design* – The design principles that apply to web-based questionnaires, including special features to improve the effectiveness of web-based surveys.
- Section 3.3: *The basics of on-line questionnaire development* – The basic principles for traditional survey development able to be used for the on-line context.
- Section 3.4: *The development of friendly and usable on-line forms* – The guidelines for constructing a web-based survey form or questionnaire that is user-friendly, usable and effective.
- Section 3.5: *Invitation methods for Internet-based surveys* – the delineation of passive and active invitation methods that are currently used on the Internet to encourage users to participate in the surveys.

When developing an effective on-line questionnaire, it is necessary to focus on the research goals, the research questions and the types of statistical analyses. The quality design of questionnaires involves creativity and precision (Barnes, 2001). Web-based survey design takes advantage of not only Graphic User Interface (GUI) design

fundamentals but also traditional questionnaire design principles. The use of graphics and symbols can increase the efficiency of web-based surveys that will result in users making less mistakes and gaining a higher rate of user acceptance (Hedge, 2005). The stages in designing a web-based survey are based on the main purposes of the research, and they include creating the application structure, determining the navigational model and designing the interface for the all-important users, their motivations and their goals (Hedge, 2005).

3.1. Web-based questionnaire elements

The first consideration in designing questionnaires is that the design needs to fit the medium (Zucker & Eaton, 2006). As already suggested, the two main theories relevant to the visual layout of web-based survey instruments are web design theory and paper-based survey design principles. Web-based survey design shares some principles used for general web design because the on-line questionnaire is presented on a web browser. The design of the web-based surveys focuses more than normal on asking approaches and responding to tasks rather than presenting information. Therefore, it is crucial to explore the ways that users fill in the on-line forms. For example, “One click away”, making the on-line questionnaire disappear easier than any paper-based survey is also a major concern (Slaybaugh & Grossman, 2003). Accordingly, it is highly relevant that web designers must attempt to make the on-line tasks as easy as possible (Slaybaugh & Grossman, 2003). The basic elements regarding web-based design include overall structure, web-based questionnaire formats, introduction section, navigation, usability, accessibility, the progressing bar and, lastly, feedback.

3.1.1. Overall questionnaire structure

In determining the overall structure of a web-based survey instrument, certain basic elements need to be considered. In drafting an on-line questionnaire for presentation on the web-page, consistency of layout such as colours, fonts and congruent images, navigation, search function, text links and the logo of web sites are critical (O'Connor, 2004). Designing the web-based survey needs to address such necessary elements as the title of the questionnaire, the page title, the content of each question, a submit button and a progressing bar. As the Thai script is left aligned, so for consistency the

logo may be placed in the top left corner with the title of the questionnaire and list of question content and answer items in grid design (Norman, 2005e).

The vertical alignment of questions means more white space, thus making it visually appealing which results in less problems with alignment and formatting (Norman, 2005e). The design should decrease the movement time by reducing the distance between the selected response check box and the 'Next / Submit' button (Norman, 2005e). Norman (2005e) further suggests that the questions are best presented in a hierarchically ordered structure for providing cognitive comfort; respondents do not need to go back and forth in their memory to retrieve.

3.1.2. Web-based questionnaire formats

It is crucial to decide also about the questionnaire formats: should all questions be on one page, or related questions grouped on the same page, or one question per page? Norman has found that this aspect impacts on the actual data collected (Norman, 2005e). Basically, questions grouped together may suggest information about the purpose of the questions and this may elicit different responses than if the questions were presented one at a time across multiple pages (Norman, 2005e). In some surveys, the reason of splitting the web page into multiple pages based on the participants' answers or a selected demographic characteristic such as gender or occupation (Zucker & Eaton, 2006).

Consequently, the evidence suggests that different formats of web-based questionnaires elicit different response rates. Using a single screen or a few screens for short surveys minimizes the respondent's abandoning or quitting the survey, whereas using a single screen and forcing the respondent to scroll down in long surveys increases abandonment (Norman, 2005e). Sectioned surveys that require scrolling should clearly indicate that additional items can be accessed by scrolling to them (Norman, 2005e). The skip pattern or, in another phrase, the branching technique, is effective in very long and complex lists of questions for reducing the numbers who quit (Norman, 2005e). Additionally, Norman (2005e) suggests that the questionnaire be shortened by eliminating unnecessary questions. As an example, questions that the computer can determine and answer such as the exact date and time when the questionnaire is filled out (Norman, 2005e). Another relevant suggestion is the hiding of inappropriate and irrelevant questions to shorten the apparent length of

the questionnaire and make such questions available only if the respondent specifically needs to answer them (Norman, 2005e).

Research studies such as an on-line study in which University of Linköping students responded to the topic of 'housing conditions', indicate that on-line users prefer to respond on the scrollable web-based questionnaire rather than multi-screen versions (Forsman & Varedian, 2002). Their preference is because the scrollable web-based questionnaire has less download time in total. Moreover, the scrollable web questionnaire takes significantly less time to complete than the one-item-per-page questionnaire (Couper et al., 2001). Additionally, these three researchers based on their web survey study with 1,602 University of Michigan students point out that the multi-screen web-based questionnaire demands more clicks. There is thus an increased probability multi-page surveys will not be completed. It is similar to asking an interviewee to call back during a telephone interview thereby increasing the likelihood of attrition. Couper and his team found that the same question has a lower response rate for web-based surveys than for pencil-and-paper tests (Couper et al., 2001).

3.1.3. Introduction section

The introduction or the welcoming section plays a role as a digitally-based initial cover letter. Communication on the Internet needs to reveal the most important information first (Slaybaugh & Grossman, 2003). As the design priority for a web-based survey, it is necessary to inform users what to expect and to provide an overview of the questions (Barnes, 2001). Participants will be persuaded or unpersuaded to devote their valuable time to completing the survey from the message in the introduction to the on-line survey (Bauman et al., 2000). The introduction message not only emphasises, briefly but critically, the purpose of the questionnaire but also includes clear explanations of how to complete the questionnaire. Above all, it outlines the conditions of confidentiality (McNamara, 1999a). Basically, the introduction needs to be mentioned that the survey findings will be revealed as overall results, not individually. It is politeness always to include a thank you page (Norman, 2005e). Additionally, the survey introduction is crucial to consist of concise and unambiguous wording for instructions and messages and to use a balanced screen layout (Barnes, 2001; Hedge, 2005).

3.1.4. Navigation

Navigation in regard to web-based surveys refers to the movement from one section to another or one question to another (Norman, 2005a). Navigation can support the commitment of users by indicating to users where they are and assisting them to find their way using familiar direction conventions or a familiar metaphor (Hedge, 2005). Furthermore, in a long list of advice given on-line for these students, Hedge (2005), a lecturer of a web page design course, advises that a well-navigable web page uses a consistent page layout, self-explanatory text links, and avoids concise menus, giving prominence to links to key pages by highlighting the topic – he particularly warns against “click here” (Hedge, 2005). An alternate navigation technique is to minimise the number of clicks, present only important buttons or links, avoid dead ends by links to home and use meaningful page titles (Hedge, 2005).

In web-based survey design, automated navigation is automation that is checking the format and range of answers (Norman, 2005a). The automation mechanism in Internet-based surveys can arrange questions suitable for each respondent (Zucker & Eaton, 2006). After asking any “security” questions, an Internet-based survey can group participants and guide them to different questions; also Internet-based surveys can compile a record of the number of people who leave the survey because they are not a member of a targeted population (Zucker & Eaton, 2006). Therefore each group of respondents will read and respond to their specific set of questions.

3.1.5. Usability

In general, ‘usability’ means ‘ease of use’ (Alexander, 2003; Goto, 2000). In the ISO 9241, a more specific definition of usability given is “a measure of the effectiveness, efficiency and satisfaction with which specified users can achieve specified goals in a particular environment” (Alexander, 2003, p.6). Therefore, usability of a web-based survey implies the ease of usage of on-line survey forms.

Based on the usability testing by Bauman and her colleagues in their two assessments of web surveys, most web users scan written material on the web page rather than carefully read (Bauman et al., 2000). They have found that most visitors who respond to the on-line questionnaire skim the web page very quickly, ready to click on through to the next button (Bauman et al., 2000). Therefore writing style strategies for the web can increase the usability for web-based surveys are important due to the difficulty of

reading off a computer screen (Slaybaugh & Grossman, 2003). Consequently, people skim rather than read information on screen, so it is necessary to break information into chunks to help users easily digest (Nielsen, 1997). Moreover, the content should be presented in such a way as to support skimming by using bullets and keywords (Slaybaugh & Grossman, 2003). The black font is to be avoided on an overwhelmingly white screen which causes users' eyes to tire more quickly and then they will skim over the page instead of reading (Slaybaugh & Grossman, 2003). Additionally, Norman advises to organize and partition an on-line survey in order to correspond with the organization of semantic knowledge in the memory (Norman, 2005e).

3.1.6. Accessibility and disability

To ensure maximum accessibility, site design must also take into account the special needs of people with disabilities. Web accessibility becomes an important consideration since it needs to meet the requirements of these users as demanded by legislation. For example, such requirements may need to take into account the purpose for accessing the site, the frequency of visiting the site, the experience and expertise of the users as well as nationality and languages. Moreover, web designers need to know how users use the information: read on the screen, print or download, types and versions of browser, speed of connection and types of screen / window.

This current study used Web Content Accessibility Guidelines 1.0 that is a pioneer standard as a measure of web page standard. Users have three main issues pertaining to web accessibility: physical requirements, level of cognition and the technology environment. The first issue, users' physical problems, occurs when people may not be able to see, hear or move, or may not be able to process some types of information easily or at all (Chisholm, Vanderheiden, & Jacobs, 1999). By this case they may not have or be able to use a keyboard or mouse and also they may be in a situation where their eyes, ears or hands are busy or impeded (Chisholm et al., 1999). The second issue, users' cognitive problems, occur when people may have difficulty reading or comprehending text and also they may not speak or understand fluently the language in which the document is written (Chisholm et al., 1999). On the last issue, the users' technology environment, problems occur when people may have a text-only screen, a small screen or a slow Internet connection. This includes people who may have an

early version of a browser, a different browser entirely, a voice browser or a different operating system (Chisholm et al., 1999).

In order to design an accessible web site, the World Wide Web Consortium (W3C) determines 14 guidelines for implementation (see Appendix 1). Additionally, in order to check web accessibility, there are many comprehensive web accessibility software tools designed to assist, expose and repair barriers to accessibility. For example, two free services are from Watchfire Corporation, WebXACT and Bobby 5.0 that are sponsored from IBM (Watchfire Corporation, 2005).

3.1.7. Progressing bar

This technique informs participants about the length of a questionnaire. The progress bar reveals what percentage of the survey has been completed or by wording such as 'page 1 of 7 or question 10 of 12' at different intervals (Bauman et al., 2000). The research about using the progress bar in web-based surveys is still limited, so this issue will be studied in this current research. However, the University of Michigan study found that there is no significant difference in completion rate of using or not using a progress bar in an on-line questionnaire (Couper et al., 2001).

3.1.8. Feedback

Feedback is the interaction between web-based survey application and users that inform them about filling in the on-line form. An effective web-based survey provides only articulatory feedbacks, reminders and warnings at the appropriate points and also can highlight a specific ambiguous item to clarify its meaning (Hedge, 2005).

Additionally, threatening or alarming messages should be avoided through the use of specific non-alarmist and user-centred words or phrases, for example 'please enter your name' rather than 'invalid entry' or 'error 404'.

3.2. Web-based survey design

Visual design and layout influence the way that people respond to a survey according to (Christian & Dillman, 2003) who have done 14 experimental comparisons with over one thousand university students. The difference between web-based and paper-based survey design is partly based on presentation (Dillman, 2000; websurveyor.com, 2004b). The significant difference is reading familiarity between web-based and paper-based (Slaybaugh & Grossman, 2003). Web-based survey is a

unique environment that shares design principles with paper-based survey design (Andrews, Nonnecke, & Preece, 2003; Nadler, 2003) because both are self-administered surveys. The main common design principles used in both web-based and paper-based surveys are the types of survey questions, the wording and the ordering of questions (Norman, 2005c). Thus, these will be detailed briefly in this chapter.

Self-administered questionnaire information includes verbal language which refers to the words and non-verbal language which refers to numeric, symbolic, and graphic aspects. (Christian & Dillman, 2003; Redline & Dillman, 2002). ‘Numeric’ refers to the numbers; ‘symbolic’ refers to the check boxes, arrows and other symbols on the questionnaire; ‘graphic’ refers to the use of multiple design features such as font size, brightness, location, and spacing (Christian & Dillman, 2003; Redline & Dillman, 2002; Redline et al., 2002). In order to design an effective web-based user interface, it is necessary to apply the principles of web graphic design and paper-based survey design to fit an on-line survey approach. All issues regarding web-based survey are detailed in the following section.

3.2.1. Consistency

Generally, consistency is possibly the most important concept of web design (Marshall, 2001). Inconsistent use of icons, colours and terminology can actually confuse users (Hedge, 2005; IBM, 2005; Marshall, 2001). To assist respondents achieve their intention, it is necessary to provide consistent navigation (Slaybaugh & Grossman, 2003). A consistent format of question includes question numbers, instructions, space between lines, and space between question and answer (Norman, 2005b). Therefore, it is necessary to maintain display inertia, that is, there are few, if any, changes from one screen to the next (Hedge, 2005). Survey pages that are not congruent with sections are to be avoided (Norman, 2005e). The information needs to be structured rather than the mere presenting of a narrative format; unnecessary information is to be eliminated, group information presented logically and in easy-to-recognize icons (Hedge, 2005).

3.2.2. Simplicity

The principle of simplicity can reduce the difficulty of the task by breaking complex tasks into simpler tasks and breaking long sequences into separate steps (Hedge, 2005). Furthermore, it is preferable to use icons, words and objects that are familiar and meaningful to the user (Hedge, 2005). This is because, generally, the human memory is limited (Hedge, 2005). Therefore, the well-organized web-based survey will be designed to let users recognize rather than recall information in order to minimize working memory loads (Hedge, 2005). For instance, Hedge's suggestions are organizing information into a small number of "chunks", creating short linear sequences of tasks, organizing data fields to match user expectations such as phone numbers and providing cues/navigation aids such as direction arrows and status indicators to show the user his or her progress.

3.2.3. Use of colour

The necessary, perhaps golden, rule of colour usage in web-based questionnaires is consistency (Straub, 2005) which is aided by not using too fancy or too many colours or fonts that might distract the user (Dillman, 2000; Dillman, Tortora, Conradt, & Bowker, 1998; Zucker & Eaton, 2006). Referring to web graphic design principles, Hedge's advice is not to use more than four different colours on a screen (Hedge, 2005). Colour is the most common cue for signalling the consistency of pages (Straub, 2005). Referring to findings of observations, users look at colour first and then attempt to derive a meaningful grouping from similarly coloured elements (Van der Geest & Loorboch, (2005) as cited in Straub, (2005)). In addition, Norman suggests restraint in the use of colour so that figure/ground consistency and readability are maintained and navigational flow is unimpeded (Norman, 2005d). Red should be reserved for emergency messages or critical icons (Norman, 2005d). Furthermore, red-green distinctions are to be avoided as are use of intense combinations of colours because respondents may lose attention (Norman, 2005d). About background colour, the simple colour can reduce interrupting the task and alternate the background colours for each response category when using grid format for a long list of responses (Norman, 2005d). A web-based survey needs to specify a background colour, because in some computers, the browser background shows only transparency (Zucker & Eaton, 2006).

3.2.4. Graphics

Enhancing an on-line questionnaire with a visual element which includes images can produce a lower response rate but paradoxically a higher response quality (Deutskens et al., 2004). Deutskens et al., (2004) conducted surveys in the marketing area, and they found that if a long on-line questionnaire with lots of graphics which usually takes time to download is used, people tend to quit early (Deutskens et al., 2004). Downloading times impact on the motivation and commitment to participation (Slaybaugh & Grossman, 2003). However, subtle background graphics can improve the quality of tone of web-based surveys. If done carefully, adding graphics such as an organization logo and graphics with a specific purpose can be a good way to decorate the web-based survey. However, it is not a good idea to put graphics in to the web page just because it has space since it will take a longer time to down-load since most Internet users connect via modems (websurveyor.com, 2004b; Zucker & Eaton, 2006). In order to minimise the download time, the designer can reduce the size of graphics. The technique is using small images with interlaced images and also repeat images where possible and using 'IMG SRC' and the 'ALTErnate text' tag (Hedge, 2005). The 'Alt' tag on a web page is a text description added to the HTML tag that displays an image whenever either the cursor is moved over the picture.

3.2.5. Use of multimedia features

Technically, multimedia implies text, photo, animation, audio and video. However, the usage of multimedia in web-based surveys is referring to animation, sound and video rather than text and still images. Multimedia features are distinctive and they increase the effectiveness of a web-based survey and make it different from paper-based; however, it needs to be used sparingly since it can significantly slow the downloading of a web page (Hedge, 2005; IBM, 2005; Norman, 2005d).

Norman (2005d) on the other hand considers other issues about the use of multimedia features in web-based surveys. Multimedia should be used only when they are core to understanding the question(s) because pictures and sound may convey unintended meanings, and then lower the validity of the answers. It is possible that respondents may interpret questions in the context of the graphics and images. Usage of multimedia features may limit the accessibility which increases the measurement error because of the limited accessibility only in some users. Moreover, multimedia usage

might decrease response rates since some users might decide to close a window due to the additional loading time. It is difficult to control for consistency across different systems in terms of presenting the multimedia features. The congruence between the images/sound and information is another last concern.

3.2.6. Typography

Responding to self-administered questionnaire is influenced by the display of questions and answer (Christian & Dillman, 2003). The typography used in web-based surveys is a combination of the writing style for the web and writing for paper-based surveys. However, it is crucial to focus on the typography issue for Internet surveys because the way of reading is significantly different. Reading on the computer screen is different from reading on paper because some users do not read large amounts of text or even read the web page, and people scan the computer screen by looking for key words and phrases (Andrews et al., 2001; Nielsen, 1997; Norman, 2005e; Slaybaugh & Grossman, 2005). Reading speed on the web is around 25 per cent slower than reading from paper (Cousin & Vinckenbosch, 2000). The research on reading speed on the screen had anticipated that students, might read 50 per cent slower on the screen, thus it is crucial to design the material in order to reduce any difficulty in reading (Perrin & Rueter, 1998).

This is because the first rule of writing an on-line questionnaire is to ‘keep it short and simple’ (KISS) (Zucker & Eaton, 2006). Additionally, the initial step is setting a clear overview of the content, then starting with the basic aims, present only meaningful and core information and use familiar terminology (Norman, 2005e).

‘Readability’ that refers to the likelihood of users’ motivation to pick up material, then begin to read and continue reading it with understanding is different between web page and paper copy (Perrin & Rueter, 1998). Users tend to choose the screen that presents more graphics, less text with larger spacing between lines arranged in smaller columns (Perrin & Rueter, 1998). On the paper copy, conversely, people are able to read lots of text in full width of document and fewer images (Perrin & Rueter, 1998).

The other concern is providing readable and usable text; again the experiences of others suggest the avoiding of patterned backgrounds due to difficulty of reading. In

order to support different browser environments, it should use a writing style to support text only browsers and with a logical hierarchy of headings and use of meaningful headings (IBM, 2005; Norman, 2005e). In the typographical aspect, techniques that are suggested include: bold, italic or different colours for key words to assist in making the questionnaire easy to understand (Zucker & Eaton, 2006).

Underlining for emphasis on a web page is not recommended since the underlined word means hyper links. Furthermore, text on a web page should be easy to scan by presenting information with bulleted lists, using highlighted keywords, and paragraphing short sections of text (Norman, 2005e; Slaybaugh & Grossman, 2005).

Reading on a scrolling page and on paging are no different in speed, but paging results in better comprehension and memory of information (Bailey, 1999).

Additionally, younger users (ages 19 to 36) tended to scroll a “line at a time” while reading on the web page (Mead, Spaulding, Sit, Meyer and Walker, (1997) as cited in Bailey, (1999)). They conclude, “viewing a ‘page at a time’ seems to require less cognitive load than viewing a ‘line at a time’ while scrolling” (Bailey 1999, para. 2). Older users prefer a ‘page at a time’.

It is further recommended the instruction section use smaller fonts and a different colour from the question text since it is easier to follow (Zucker & Eaton, 2006). Referring to web graphic design principles, Hedge suggests not to use more than four different font sizes on a whole page and not use more than three fonts on a single screen (Hedge, 2005). In order to provide an adjustable font size, the designer might choose to use fonts that users can adjust the text size on a browser program rather than fix the text size as graphic (Slaybaugh & Grossman, 2005).

Referring to one of the recommended construct web accessibility rules, the suitable font size for web-based survey body text is “-1” (minus one) (Kirkpatrick, 2003). This might be because a web-based questionnaire consists of many sections of information. The usage of plain ‘sans serif’ fonts which basically include Verdana, Arial, Tahoma and Helvetica on appropriate background assists users to read faster (Hedge, 2005; Perrin & Rueter, 1998; websurveyor.com, 2004b). This also occurs in Thai web sites because the most popular font used for presenting information is ‘MS Sans Serif’. The font sizes for both Thai and English on the web page are the same size (see Figure 3.1.). The “-1” is a setting of font size in the web page source code which differs from

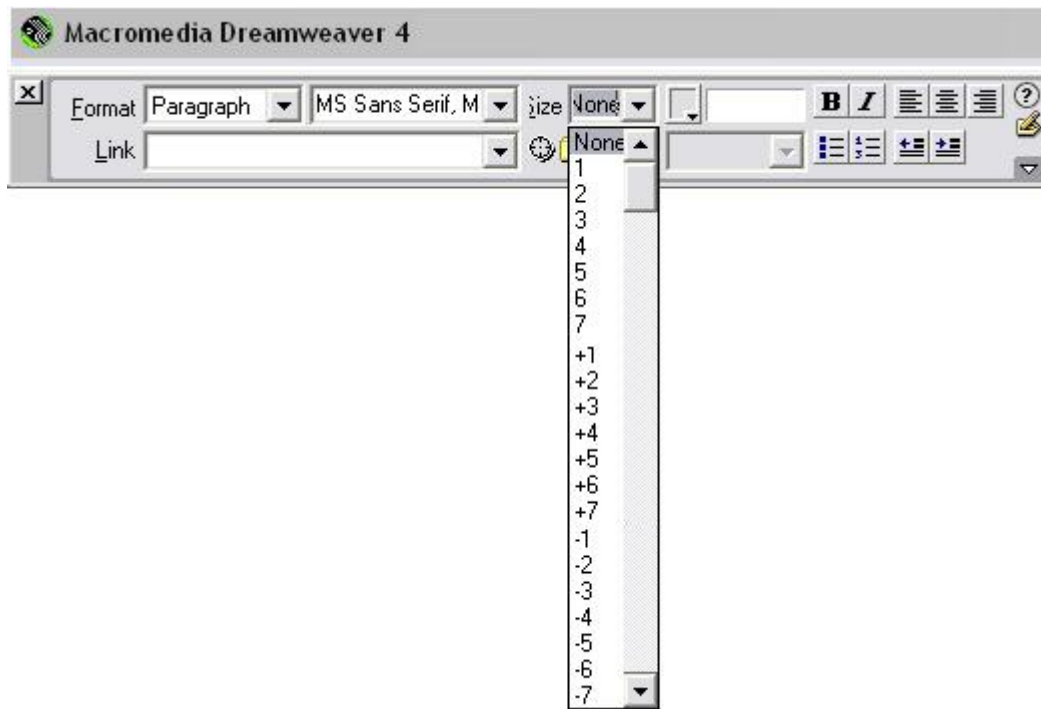
units of measurement in paper-based. The font size order from small to large is 1, -1 and +1 respectively. In comparison of points, sizes and pixel of fonts presented on the web page, the “-1” equals to ten points or 14 pixels (see Figure 3.1.).

Figure 3.1.: Comparison of different sizes of font

English (font: MS Sans Serif)	point	size	pixel	Thai (font: MS Sans Serif)
Web-based survey	-	1	-	แบบสอบถามทางอินเทอร์เน็ต
Web-based survey	-	-	12	แบบสอบถามทางอินเทอร์เน็ต
Web-based survey	10	-	-	แบบสอบถามทางอินเทอร์เน็ต
Web-based survey	-	-1	-	แบบสอบถามทางอินเทอร์เน็ต
Web-based survey	-	-	14	แบบสอบถามทางอินเทอร์เน็ต
Web-based survey	12	-	-	แบบสอบถามทางอินเทอร์เน็ต
Web-based survey	-	+1	-	แบบสอบถามทางอินเทอร์เน็ต
Web-based survey	-	-	16	แบบสอบถามทางอินเทอร์เน็ต

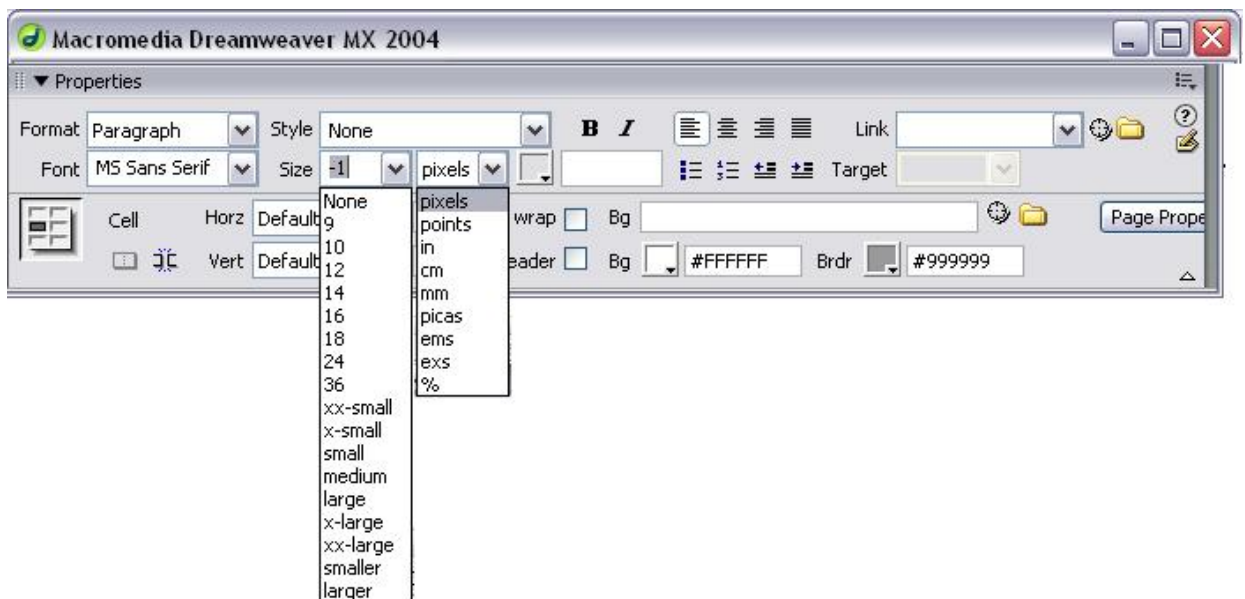
Before 2004, the web building software such as Macromedia Dreamweaver 4 and previous versions had setting functions of font size as numbering that divided into three groups (see Figure 3.2.).

Figure 3.2.: Font properties in Macromedia Dreamweaver 4



However, the more recent version of the web building software such as Macromedia Dreamweaver MX 2004 provides a function of font properties that are comparable to the common unit used in paper-based and other graphic modes such as pixel, point and so on (see Figure 3.3.).

Figure 3.3.: Font properties in Macromedia Dreamweaver MX 2004



With Roman script writing style, people have difficulty to read uppercase. However, the Thai language does not have uppercase letters, so there exists no problem about uppercase / lowercase mix. However, in order to prevent problems when using any browser, when writing in Thai, only the MS sans serif font can be used. Use of other fonts might make the Thai script illegible. Other fonts can be used for a normal Word document but not if the document is to be uploaded. Other non-Roman script languages have similar problems.

3.2.7. Presentation on the screen

The audience and the survey administrator see the paper-based survey form in the same version. Conversely, the web-based survey will look different to different computers depending on the resolution of the computer screen, font size and monitor sizes (Dillman, 2000) and also browser settings, user preferences and variations in hardware (Couper, (2000) as cited in (Andrews et al., 2003). People usually are resistant to scrolling a screen right and left but most users are comfortable scrolling a page up and down. Most Internet users find horizontal scrolling annoying, so it is recommended not to design web pages which require horizontal scrolling (Zucker & Eaton, 2006). The important information is to be fitted onto one screen.

In order to control the web-based survey presentation, it needs to be designed for the majority of browsers and tested before launch (Slaybaugh & Grossman, 2003). To test web-based survey visibility, the surveyors' computer monitor should be set to 640 x 480 pixels (Slaybaugh & Grossman, 2003) or 800 x 600 pixels which are what most Internet users use (websurveyor.com, 2004b; Zucker & Eaton, 2006).

3.3. The basics of on-line questionnaire development

Fundamentally, the key preparation in questionnaire design is to clearly articulate the research question(s) and focus on the information that needs to be gathered (McNamara, 1999a; Taylor-Powell, 1998). The effective survey consists of questions that are simple, focussed and appropriate (McKeown, 2003). The types of survey questions, the principles of wording and ordering of questions are the same whether using traditional or on-line methods of data collection. All kinds of questions used in paper-based surveys can be used in web-based surveys. Thus, the relevant issues will be detailed briefly in this section.

3.3.1. Types of survey questions

Information collected via questionnaires are categorised into *knowledge* - what people understand, *beliefs* – attitudes or opinions, *behaviour* – what people do, *attributes* – personal and demographic characteristics (McNamara, 1999b; Taylor-Powell, 1998). To gather information on personal or demographic background details, questions are designed to elicit the relevant attributes (Barnes, 2001; de Vaus, 2002; Taylor-Powell, 1998). Attitudinal questions are assessments or measures of respondents' feelings about something using Likert scales or semantic differentials (Barnes, 2001; de Vaus, 2002; Taylor-Powell, 1998). To elicit respondents' beliefs or opinions about their behaviour, behavioural questions are used (Barnes, 2001; de Vaus, 2002; Taylor-Powell, 1998). Asking questions about behaviour is focussing on personal experiences, whereas, on the contrary, asking about beliefs is focussing on people's cognitive knowledge of something (Barnes, 2001; Taylor-Powell, 1998).

The two main types of survey questions: open-ended and closed-ended will be used in different situations (Taylor-Powell, 1998). On the one hand, the open-ended are accurate when the survey researcher does not know all the possible answers and when respondents' own words are important (Waddington, 2005). On the other hand, the closed-ended questions are required for the collection of rank ordered data when all response choices are known and when quantitative statistical results are desired (Waddington, 2005). It is crucial to understand that asking a question on one topic can be structured in different ways (Taylor-Powell, 1998). The five core styles of closed-ended questions are the following and are described in the appendices (see Figures about different types of questions in Appendix 2) (Battey, 2005; McNamara, 1999b; Waddington, 2005).

1. **A rating scale** is an assessment or measurement tool about a person's feelings about something. For example, a Likert scale, semantic differential scale and staple scale.
2. **A multiple option question** sets up a finite number of options or alternatives. Multiple option questions can ask for single or multiple answers using a list of check boxes.
3. **An ordinal scale** is a set of entities that people choose to rate in relation to other entities.

4. A **categorical scale** is a set of categorized answers whereby each respondent must choose one of the answers. For example, a dichotomous question that is generally a "yes/no" question screens out respondents or separates people into groups.
5. A **numerical scale** is composed of real numbers such as age or income.

The usage of closed-ended questions containing an option such as "other" can reduce the difficulty of completion by only requiring ticking or filling in the blank that shows the survey will not require much effort (Barnes, 2001; Waddington, 2005).

Furthermore, using many open-ended questions usually requires the respondent to reach deep into their memories or to explain why they do or believe certain things which often makes respondents feel uncomfortable (Barnes, 2001). Additionally, a survey can contain one or many open-ended questions or both although in this case there is the difficulty to catalogue through a content analysis, long responses or interpret answers (Suskie, 1996; Waddington, 2005).

Odd and even numbers in scales are an interesting issue. Odd number scales give a neutral option but an even number forces people to give only clearly positive or negative answers which makes analysis easier (Zucker & Eaton, 2006). However, on balance, the best for web-based questionnaires or other self-administered surveys is the odd scale (Zucker & Eaton, 2006) as it reduces frustration by allowing respondents to choose a middle answer, otherwise people just leave a blank or quit the survey (Zucker & Eaton, 2006). The rating scale labels need to be meaningful and not force most answers into the middle category since the result will not be useful information (Zucker & Eaton, 2006). In practice, a score of one means very poor and five means very good.

Culture is an important issue that needs to be considered, especially in conducting surveys in third world countries (Zucker & Eaton, 2006). The scale which is understood well by most respondents in third world countries is a three-point scale (good/ acceptable/bad) (Zucker & Eaton, 2006). Moreover, people have a strong tendency to exaggerate answers and most often give correct answers rather than what is their actual opinion (Zucker & Eaton, 2006). For university graduates a ten-point scale will work though it is not to be recommended - for most populations, five points is more than sufficient (Zucker & Eaton, 2006).

3.3.2. Wording of questions and answer choices

Precise language use for questions and answer choices must support the purpose of the survey with understandable meaning clear to every respondent in a particular population (Barnes, 2001). In a survey that has various groups of respondents, it might happen that some words seem straightforward for some but become complicated for another, so the researcher must be sensitive to the population under investigation (Barnes, 2001). Additionally, it is a good idea to avoid questions that require the respondent to do a lot of thinking, for example, past time references such as “In the last three months, how many times did you go to the ABC bank?” (Barnes, 2001). The effective questionnaire should provide information that may help respondents make correct responses, for example, offering a range of responses to cover most contingencies (Barnes, 2001). It is suggested to include a “prefer not to answer” and / or “do not know” category for every item than to force respondents to answer every question (Norman, 2005b).

The precise wording can protect habituation of responding by using negative wording (Zucker & Eaton, 2006). Additionally, wording that prevents loaded questions and leading questions can reduce respondents’ bias. The phrased positive or neutral question is easier to answer than questions with a negative, especially double negative questions (Barnes, 2001; McNamara, 1999a; Taylor-Powell, 1998). de Vaus (2002) indicates a check list of question wording that covers all issues that survey researchers need to consider as follows, and these are outlined in Appendix 3.

The wording of a survey affects response rates. Difficulty of answering is one of three statistically significant predictive variables of a regression model for attrition of web-based surveys (Manfreda & Vehovar, 2002b). The other two variables are characteristics of the target population and the value of incentives (Manfreda & Vehovar, 2002b). Attrition is higher when a survey is conducted with general rather than specific populations. Moreover, the difficulty of answering only open-ended questions which are related to an interesting topic makes people leave the survey (Barnes, 2001; Manfreda & Vehovar, 2002b).

3.3.3. Order of questions

The web questionnaire should begin with a question that is fully visible on the first screen and it should be an easy and interesting question (Dillman, 2000; Eaden,

Mayberry, & Mayberry, 1999; Norman, 2005b; Pappajohn, 2005; Zucker & Eaton, 2006). This will reduce the number of respondents who close the first web page and assist all respondents to comprehend and respond without problem. Importantly, all questions and answers should be ordered logically (Eaden et al., 1999; Zucker & Eaton, 2006). Referring to the funnelling technique, questionnaires usually begin with general questions and are followed by more focused questions - this can help produce answers to sensitive issues (Barnes, 2001). If so, the first section should contain easier questions, the middle section can contain the most important topics and the end of survey is demographic and other classification questions (Pappajohn, 2005).

The demographic section that includes sensitive questions such as age, income and so on ought to be placed at the end of questionnaires (Dillman, 2000) since these are quite personal information (O'Rourke & O'Rourke, 2002). On the one hand, surveys using the filter question technique can distinguish those individuals who cannot respond appropriately to a question (Barnes, 2001) by asking some simple demographic questions. On the other hand, particular demographic characteristics can also group participants into particular groups because it is possible that each group will be asked different questions. Moreover, it is better to inform the participants at the beginning of the survey about the rationale of exclusion from the survey, perhaps because there are enough respondents with the same demographic feature who have already completed that survey. Additionally, this filter technique can also reduce sample error when the researcher has determined the exact frame of population. Lastly, the researcher should know at least who has entered the survey and not completed the remaining questions of the questionnaire (Woods, 1995). Therefore, the question order in the demographic section should depend on level of sensitivity of questions and survey design techniques used in the survey. In addition, this issue should be researched more in order to understand how users' attitude toward the place of the demographic section influences completing web-based survey. It is likely there are cross-cultural differences on this point. This is also one of the objectives that will be examined in this current study.

Small issues regarding the order of questions are presented in many ways such as the subsequent item will be present before respondents select an answer to each prior question (Norman, 2005b). Another issue, for example, is how the order of options

affects the total results because people tend to pick the nearest option at the start of a list when they read whether on paper or on the computer screen (Zucker & Eaton, 2006). It is crucial to limit the length of each question and item because a long line of prose extended across the screen of the respondent's browser may be daunting (Norman, 2005b). Use of indexes for sections and pages is to be used sparingly due to their marginal benefit and it sometimes leads to confusion (Norman, 2005b).

3.3.4. Length of questionnaires

This current study defines length as the number of questions and approximate duration of completing the on-line form. In on-line surveys, questionnaire length has a very significant effect on response. Generally, the shorter the questionnaire, the higher the response rate due to its looking less formidable (Barnes, 2001; Smith, Olah, Hansen, & Cumbo, 2003; Suskie, 1996). The long questionnaire frequently causes people to decide to quit a survey (Burchell & Marsh, (1992) as cited in Galesic, (2005); Linderman & Fried, 2004)). Frequently, survey questions requiring long responses are left blank (Barnes, 2001). Thus, it is necessary that a survey ask similar information only once, both paper-based forms and web-based forms, in order to keep the form as short as possible (Baker, 2001). Galesic (2005) in an empirical study using questionnaires of three different lengths in an on-line context found this effect but the findings of the empirical studies are equivocal because researchers use different definitions of questionnaire length (Galesic, 2005).

The short questionnaire which does not contain more than 20 questions gains a greater response rate (Deutskens et al., 2004). The questionnaire should have between 25 and 35 questions and not take longer than 15 minutes for completion (Suskie, 1996). The high attrition occurs when it is a long questionnaire investigating a sensitive topic and with no incentives (Knapp & Heidingsfelder, (2001) as cited in Manfreda & Vehovar, (2002b). However, the long questionnaire might be completed when respondents are involved with or interested in the topics (Barnes, 2001). If researchers have an interested group of respondents on a particular topic that is relevant, a long questionnaire will be appropriate (Barnes, 2001). Galesic (2005) indicated that research on the effect of questionnaire length on response rates and/or quality of data in on-line surveys is still lacking.

3.4. Constructing friendly on-line questionnaires

In practice, on-line questionnaires have been used not only for gathering information in a survey but also other processes such as sign up, login and search on the web page (Baker, 2001). The list below is some of the major characteristics of survey questionnaires that cause users to simply exit the web-based forms (Baker, 2001).

- Long and complicated questionnaires that require a lot of cognitive activity and interruption to one's time.
- Unclear questionnaires with precise purposes that are impossible to achieve.
- Irrelevant questionnaire topics that force users to answer.
- Questionnaires that take control away from the user.

Icons used for items on web-based surveys have different presentations and functions from any paper-based survey. The usage of the appropriate response icons will assist respondents to give more accurate answers (Nadler, 2003). Each type of response item has its own utility which is as follows.

3.4.1. Radio buttons and drop down boxes

Both radio-buttons and drop-down boxes are input elements with the same function: users choose only one item from all the options. Radio buttons are used to make a single option from multiple alternatives (Nadler, 2003). Drop down boxes or, to use alternative expressions, the popup menu or the menu pull down is used for questions usually having more than ten items in a single option selection (Nadler, 2003). The exceptionally long drop down boxes should not have more than 150 items (Baker, 2001). The long drop down boxes such as lists of countries should be in alphabetical order. The result from a Danish evaluation of the usage of radio-buttons vs. drop-down boxes showed that drop-down boxes require a shorter time to download which would reduce premature quitting (Heerwegh & Loosveldt, 2002). The drop-down box method is a simple technique that prevents mistakes and keeps visitors on track due to the list of options provided (Linderman & Fried, 2004).

However, in their study, Heerwegh and Loosveldt (2002) found that people feel drop down boxes are more difficult to use than radio-buttons because the drop-down boxes require more clicks. In addition, the research found that including a “no answer”

option with the radio-buttons format does not significantly increase completion rates (Heerwegh & Loosveldt, 2002).

3.4.2. Check boxes

‘Check boxes’ are used for multiple selection questions when a respondent can make multiple options and choose all the options that apply (Nadler, 2003). The results of one comparative study of choose-all-that-apply options and forced-choice options found that forced-choice formatted questions were unaffected by the use of more active answer categories (e.g. fan/not a fan) as opposed to the common yes/no format (Dillman, Smyth, Christian, & Stern, 2003).

3.4.3. Text input

The ‘text input’ method is used for open-ended questions, both as a single line and multiple line formats with scroll bars; they also are used for non-numeric scales or clear labels scales (Nadler, 2003). There are issues to be considered in conducting web-based surveys in the usage of text input such as indicating to users the limit in the number of characters. The text input of general web forms faces problems of the actual input format (Linderman & Fried, 2004). Therefore, to prevent users’ frustration, web sites need to provide feedback that indicate errors and explain what a correct format is. For example, requiring dates of birth can be confusing due to different date formats between USA and Europe as day/month/year or month/day/year. If the web form did not provide automatic data reformatting, the web form should give an example of the data format next to the fields (Linderman & Fried, 2004). The other example, namely, a question requiring visitors to input on frequency of use of the web page from one to fifteen, perhaps the users may put the same value in different items or put an alphabet letter instead of a number. Therefore, it should inform clearly in the introduction part and set up Java Script to prevent errors.

3.4.4. Overall guidelines

The overall guidelines are the functions that need to be included on the form. Initially, it needs to be clearly indicated which items are ‘required’ or ‘optional’ by putting an asterisk or some other icon next to the particular field and putting the field titles in boldface (Linderman & Fried, 2004). The user-friendly designed form should preferably minimize the number of required fields whenever possible and only necessary information be collected (Baker, 2001; Linderman & Fried, 2004). On each

question, it is good to provide examples such as pull-downs and formatting hints to reduce data entry miscues (Linderman & Fried, 2004).

At the end of the web-based survey form, it is suggested to provide only one 'submit' button, then disabling the 'submit' button after the first click (Linderman & Fried, 2004; Nielsen, 2000b). The reasoning that the 'reset' button be not inserted is because only a small number of people want to delete all the information that they have just typed in (Linderman & Fried, 2004). The 'reset' and 'cancel' buttons are functions of the web page technology that attempt to mirror the features of 'OK & Cancel' and 'undo' commands (Nielsen, 2000b). However, the majority of users usually prefer to use the 'Back' button on the browser instead when there is a need to escape from an undesired state (Nielsen, 2000b). If the form includes the 'reset' button, it should have a 'confirm deletion' function to minimize the chance that a visitor deletes data accidentally (Linderman & Fried, 2004). Research findings suggest that respondents do not require a "reset" button (Heerwegh & Loosveldt, 2002). Collecting information in bits and pieces based on a user's point of view is a good strategy, so it is recommended to provide a 'save' function when it is a lengthy form (Linderman & Fried, 2004). The on-line questionnaire should be tested with representatives of the population to make sure that the questionnaire is practical whilst finding out the impractical items and functions (Baker, 2001).

3.5. Invitation methods for Internet-based surveys

This current study will also focus on different types of invitation methods that persuade users to complete the survey while accessing the Internet. This is because the on-line survey response rate depends on invitation interactivity - the more active the invitation, the better the response (Bauman et al., 2000). Furthermore, there is the greater possibility to recruit participants of Internet-based survey from Internet users rather than through offline recruitment.

Basically, the on-line recruitment techniques need to consider both technology and cultural terms and, above all, ethical aspects (MacElroy, 2000). The techniques are considered to be offensive because they include all kinds of automated emails that are not preceded by any relationship and permission-based contact. They are like spam coming from detection technologies, namely Sniffers, Web crawlers or smart bots for

instance. The technology technique will not provide a good response rate and perhaps will gain a response rate of less than one per cent.

The recruitment strategies regarding Internet-based surveys have been categorized into four (MacElroy, 2000). The respondents can be derived from off-line recruitment, pre-recruited panels, site intercept and customer database samples, the order referring to the overall response rate from least to most respectively according to MacElroy (2000) with extensive experience in the field. The off-line recruitment gained the lowest response rate since it is difficult to persuade people to participate in on-line activity when advertisements are placed such as in the newspapers, calling and the mail. For example, the Norwegian Census 2001 was sent by post and offered a web-based survey as an option, even though 60 per cent of the population have access to the Internet. Cahill and his colleagues' (2004) experience was similar in the electronic consultation with the Australian people following the September 11th terrorist attacks (Cahill et al., 2004). As previously mentioned, slightly less than ten per cent completed the on-line survey (Haraldsen et al., 2002). About telephone pre-recruiting which might use random digital dialling, the response rates might be expected to be between 50 and 60 per cent from respondents who agree to participate and give a valid email address (MacElroy, 2000). This rate can be accomplished only if it is an interesting topic plus it has an incentive (MacElroy, 2000). However, this mechanism is costly. The last ethical recruitment technique is drawing on a customer database sample, which perhaps gains the highest response rate of between 20 to 50 per cent (MacElroy, 2000). However, this also depends on the relevance and interest in the topic. The site intercept methods can be categorised into two as described in following.

3.5.1. Passive invitation method

The site intercept is a technique which recruits the user's attention by posting advertising such as banners or normal text links; it is the most difficult to know the response rate because it is difficult to know the contact rate; also it is a passive methodology (MacElroy, 2000). Banners or icons on web sites inviting visitors to share their opinions is completely passive because users make a decision to click and then the second decision is whether or not to complete the survey request (Bauman et al., 2000, p.6). However, the advertising method obviously informs the main users of

a particular web site and also there are a limited number of studies about the response rate from this technique. The passive invitation method used in this study is the ‘advertising marquee’ in full banner size (486 x 60 pixels) that reveals a message loop on the advertising banner. The advertising marquee technique is similar to the general advertising banner that randomly presents an advertising message.

3.5.2. Active invitation method

An active method is the interstitial window - a pop-up window - a new browser window that can command users’ attention. Similarly, the other interstitial window is a message box – a new message window pop up when the user clicks appropriately on any links on a homepage. These two kinds of active invitation methods are not only the pop up when users entrance the web or click on links on a web page but also it can be set randomly open for every nth visitor in order to reduce self-selection bias.

The pop-up window has been indicated as an effective method of inviting users to participate in an on-line survey (Comley, 2000). However, recently, the pop-up window not only has fallen out of favour as an invitation method due to many web sites using it as advertising (websurveyor.com, 2004a) but also being blocked in the browser option. Conversely, these active invitation methods seem to make impositions upon on-line users. In addition, the presentation of a pop-up window is cautiously using attention-grabbing techniques by eliminating ‘blinks’ flashing or animation and high contrast colour combinations due to eye distracting (Hedge, 2005; IBM, 2005). The effective pop-up window should be of very small size, include minimal text and contain a click link to the survey (websurveyor.com, 2004a).

Information in both pop-up windows and message boxes communicate directly to the main users of a particular web site. A review of the literature on this point still revealed only a limited number of studies about the response rate from the pop-up window method and none from the message box technique. In the early 21st century, the average response rate for the pop-up window method is estimated at between 15 to 30 per cent, which is higher than banners and badges on the web page (MacElroy, 2000) though better empirical validation is needed.

3.6. Summary

The Internet-based surveys have distinctive technological, demographic and response characteristics that affect the design, development and administration of the questionnaire. Clearly there is much knowledge relevant to the effective design and use of paper-based surveys that does not translate directly into the electronic format. This chapter on Internet-based survey design has examined the various elements of web-based questionnaires, graphic user interface design of web-based surveys, basic questionnaire development, methods of constructing an effective on-line questionnaire and the invitation methods for Internet-based surveys. Due to its different presentation from the paper-based survey, the on-line questionnaire has been shown to have differences in overall structure, format, introduction section, and especially web page features such as navigation, usability, accessibility, the progressing bar and feedback. The web-based survey design principles have focused on the main issues relevant to perception: consistency, simplicity, use of colour graphics, use of multimedia features, typography and screen presentation. The fundamentals of questionnaire development as applied to the on-line format has consisted of types of survey questions, wording of questions and answer choices, order of questions and length of questions. The rules for constructing a friendly on-line questionnaire have been considered in relation to the use of icons as response items that differ from paper-based ones such as radio buttons, drop down boxes, check boxes and text inputting. Two main types of invitation methods of Internet-based survey have been examined: passive and active invitation methods. As well, cross-cultural issues regarding the use of a language other than English, namely Thai, have been referred to as well as the more general issue that empirical studies concerning the use of non-English languages, especially languages with different scripts or character-based languages, in on-line surveys are lacking.

CHAPTER FOUR

INTERNET USE IN THAILAND

The growth of the digital society has markedly affected information technology development across the world and in Thailand. This chapter will provide important details that relate to Internet use in Thailand. Generally, Thai people use the net for several purposes, especially communication, commerce, entertainment and education. The objective of this chapter is to present evidence on Internet use in Thailand, based on data available from March 2003 to January 2004, when this part of the study was undertaken. The rationale for dividing this paper into four main parts is to outline Internet usage in Thailand, moving from the big picture to specific details. In preparing this chapter, four main data sources relating to Thai Internet-based survey use were selected for preliminary investigation that has been organized into the following five sections.

- Section 4.1: ***Statistical data on Thai Internet usage*** - statistical data on Thai Internet usage will indicate the use of the Internet in selected comparative countries as well as in Thailand.
- Section 4.2: ***Thai Internet user profiles*** - the information of Thai Internet user profiles with demographic information about people accessing the Internet in Thailand.
- Section 4.3: ***Languages used on Thai web sites*** - the analysis of language usage profile in Thai web sites. This is crucial to ascertain because Thailand is a developing country with a non-English speaking, non-colonial heritage. The main language use for the print and electronic media in Thailand is different from neighboring countries in the Southeast Asian region.
- Section 4.4: ***Research studies of Thai Internet-based surveys*** – information about web-based survey research in Thailand.
- Section 4.5: ***Selected Thai university*** – information about the population at the Thai university selected for the study.

4.1. Statistical data on Thai Internet usage

To detail the features of Thai Internet usage, statistics relating to Thai Internet use were collected from Internet survey web sites at Nua.com, NECTEC (National Electronics and Computer Technology Centre of Thailand) and NSTDA (National Science and Technology Development Agency of Thailand) in January 2004. The figure from NECTEC for Thai Internet users has been estimated after conducting household surveys (NECTEC & NSTDA, 2003b). The majority of the figures on Internet usage come from Nua.com by Computer Scope, an on-line source for statistical information on Internet usage. The survey methodology which Nua.com uses for monitoring the global Internet user population is as follows (ComputerScope, 2004e):

- Where possible, ‘How Many On-line’ figures differentiate between adults and children who have accessed the Internet at least once during the three months prior to the survey. Where these figures are not available, figures for users who have gone on-line in the past 6 months or past year, or ever used, are utilized.
- An Internet User represents a person with access to the Internet and is not specific to Internet Account holders. When the figure for Internet Account holders is the only information available, this figure is multiplied by a factor of three to give the number of Internet users.
- When more than one survey is available on a country’s demographic profile, Nua.com will take the mean of the two surveys or, in the case where Nua.com feels one study may be more comprehensive than the other, Nua.com will quote this figure over the other.

4.1.1. Internet usage across the world

This section provides the recent data relating to Internet usage in Thailand and some selected countries as shown in Table 4.1. The selected countries presented in Table 4.1. are countries useful in understanding estimates of Internet usage in Thailand. The purpose of Table 4.1. is not to provide a comparison of Internet use across countries at precisely the same point in time as this is not yet possible; rather it collates the latest census details in each year on numbers of people who use the Internet. Table 4.1. documents the number of Internet users in selected countries. It shows the differences

in the numbers of people using the Internet in Thailand and some other countries and across the world generally.

Table 4.1.: Internet usage across the world

Source: * = ComputerScope, (2004d), **= NECTEC & NSTDA, (2003b),
 *** = ComputerScope, (2004a), **** = ComputerScope, (2004c),
 ***** = ComputerScope, (2004b), N.A. = not available as at September 2005

Country	Internet User Percentage of Total Population		
	Year of survey		
	2001	2002	2003
Around the world*	9.10	9.98	N.A.
Thailand**	5.64	7.38	9.56
Hong Kong***	54.50	59.58	N.A.
The USA****	59.75	59.10	N.A.
United Kingdom*****	55.32	57.24	N.A.
Australia***	52.49	54.38	N.A.
South Korea***	46.40	53.80	N.A.
Canada****	45.71	52.79	N.A.
Taiwan***	51.85	N.A.	N.A.
Singapore***	49.3	51.84	N.A.
Japan***	N.A.	44.10	N.A.
China***	2.08	3.58	N.A.
India***	0.67	N.A.	N.A.

Table 4.1. shows the global average for Internet use is a little higher than the Thailand usage, slightly below ten per cent of the world population (ComputerScope, 2004d; NECTEC & NSTDA, 2003b). However, this table also shows that in 2002 Hong Kong had a much higher Internet usage (almost 60 % of the population) than many other countries. By contrast, the trends in Internet usage in two developing countries with large populations namely, China and India, show the similarity regarding Internet usage. China has only 3.58 per cent of its people using the net. However, China is the fastest growing country in Internet use (Signore, 2003). In 2001, India had less than one per cent of the population accessing the Internet, even

though the Indian government promotes Bangalore as a major software city. These two countries have only a small percentage of the population use the net

The Internet situation in Thailand indicates that Thai Internet usage is low in relation to other countries. One of the issues is hardware price - the Thai Government has a plan to reduce the hardware price by manufacturing computer equipment in Thailand rather than import (ICT Thailand, 2004). Basically, computer hardware costs in Thailand are not as expensive as in other developed countries in Asia. However, computers and accessories are still expensive for most middle-class people. Additionally, the infrastructure is another problematic. The majority of people accessing the Internet are charged by Internet service providers and also must pay connection fees. The Integrated Services Digital Network (ISDN) is a service still limited to some urban areas in Thailand.

The growth of Internet usage in Thailand has been supported by the Thai government Information Communication Technology (ICT) policies. Its national information technology plan, which has been implemented for a decade, aggressively aims to increase access to and use of the world wide web for communication (Thuvasethakul & Koanantakool, 2002). In 2003, the Thai government provided a project for cheap PCs and lap tops. The cheap PC and laptop project facilitates people not having their own computers. People could pay by both cash and installments to buy hardware.

Across the world, government policies of countries with the highest percentage of Internet users facilitate Internet use for many reasons. For example, in Hong Kong, the administration envisions the Special Administrative Region (SAR) as “a leading city in the world for the development and use of information technology, especially in electronic commerce and software engineering” (The Government of the Hong Kong Special Administrative Region, 2003, para.2). Other policy examples are seen in the USA, the country which constructed the first web networks, which now promotes the Internet for business, education, military, entertainment and health purposes. The Australian government in its various policy statements suggests that providing an ICT industry is an attractive and worthy objective (Lewis, 2002). This is because the “ICT sector has the potential to make a significant contribution to domestic growth and the nation’s trade balance” (Lewis, 2002, para.1). Furthermore, the Singaporean government has set clearly articulated goals, policies, resources and projects that will

“transform Singapore into an intelligent island, where IT permeates every aspect of the society - at home, work, and play” (Choo, 1997, para.3).

The main finding of this section is that the average proportion of Internet users in Thailand relative to the rest of the world as a whole is a little lower. Hardware cost obstacles and infrastructure limitations hinder the growth of Internet usage in Thailand. Government policies are one of the main factors that influence use of the Internet around the world. Most countries have plans to enlarge the use of the Internet to improve both the domestic economy and their commercial overseas trade. Therefore, the numbers of people using the net are increasing dramatically due to government encouragement.

4.1.2. Internet usage in Southeast Asia

Table 4.2. presents a comparison of Internet use in Southeast Asian countries ranked in order. The country with the highest Internet use in Southeast Asia is Singapore with twice as many users (51.84 per cent) as Malaysia (25.15 per cent). Internet usage in Brunei, Thailand and the Philippines is approximately the same (between ten per cent and eight per cent approximately). Other Southeast Asian countries use the Internet significantly less than the top five Internet user countries.

There is some evidence to explain the difference in the number of Internet users in each country in Southeast Asia. Singapore claims the success of its computerization program in 1981 was due to the governments' obvious vision (Singapore ICT Policy - A 'model' for ASEAN countries, 2002). The Malaysian government has recently promoted the first ambitious plan to increase computer literacy since 1996 (Foong-Mae, 2002). Since then, “the Malaysian Government has introduced various initiatives to facilitate the greater adoption and diffusion of ICT to improve capacities in every field of business, industry, education and life in general” (Foong-Mae, 2002, para.1) The Government ICT policies in both Singapore and Malaysia have stimulated the growth of Internet use.

Table 4.2.: Internet usage in Southeast Asia

Source: *=NECTEC & NSTDA, (2003c), **=NECTEC & NSTDA, (2003a),

***= Nua Internet Surveys, (2003)

Country	Internet Users		
	Date	Number (Million)	Internet User Percentage of Total Population
Singapore***	April 2002	2.310	51.84
Malaysia***	December 2001	5.700	25.15
Brunei***	December 2001	0.035	9.97
Thailand**	January 2003	6 est.	9.56
The Philippines***	December 2002	4.500	7.77
Indonesia***	January 2002	4.400	1.93
Vietnam***	December 2001	0.400	0.49
Lao***	December 2001	0.010	0.17
Cambodia***	December 2001	0.010	0.08
Myanmar (Burma)***	December 2001	0.010	0.02

Most Southeast Asian countries are developing nations. The economics and politics of the developing world rely on transmission of information (BOOZ-ALLEN & HAMILTON, 2000). The introduction of the Internet in Southeast Asia may be related to many indexes whether computer literacy or English literacy of the population. However, after researching many factors, the facts show one of the most important economic indicators that correlates to the number of Internet users is per capita income as shown in Table 4.3. This is not surprising.

Table 4.3.: Internet usage X per capita income per year in Southeast Asia

Source: * = Special Broadcasting Service, (2001)

Internet User Percentage of Total Population in Each Southeast Asia		Per Capita Income per year (US\$)*
Singapore	51.84	27,800
Malaysia	25.15	10,700
Brunei	9.97	17,400
Thailand	9.56	6,400
The Philippines	7.77	3,600
Indonesia	1.93	2,800
Vietnam	0.49	1,850
Lao	0.17	1,300
Cambodia	0.08	710
Myanmar (Burma)	0.02	1,200

The ten Southeast Asian countries have different patterns of Internet use. Table 4.3 combines data relating to per capita income per year and Internet usage in Southeast Asian countries. The table provides evidence of a strong correlation between the two variables. For example, Singapore has the highest per capita income and is also the country with the highest level of Internet use. Even though Brunei has the second highest country with the highest per capita income, Malaysia has a higher percentage of Internet users. Oil, the major export product of Brunei, makes for a high per capita level for a small population of 300,000 (Strategic Asia, 2003) than the main export of Malaysia, namely electrical and electronic products (Department of Statistics Malaysia, 2003).

Examples of other factors which relate to the use of the Internet in Southeast Asia are 1) the role of telecommunication cost; 2) infrastructure system; 3) isolation and 4) English colony background. These issues need to be addressed in a further study.

4.2. Profiles of Thai Internet users

NECTEC has conducted an annual on-line survey of Thai Internet users since 1999, commencing on 1st September until the end of October (NECTEC & NSTDA, 2003a). NECTEC is the only organization that has regularly conducted on-line surveys to collect profiles of Thai Internet users. The objective of the on-line survey project is to ascertain the demographic profile of Thai Internet users, using the same objectives, survey period, invitation method and similar questions. The promotional method is an advertising banner embedded in various web sites such as news, portal, entertainment, some government and search engine web sites. One of the limitations is a self-selection technique, which does not produce random sampling. Respondents can complete a questionnaire by clicking through the advertising banner. Moreover, they have a chance to win a gift by giving an email address as an incentive. In this way, the survey can screen people who have completed a form before. However, checking an email address is not a perfect filter because people can obtain more than one email address easily. Additionally, NECTEC, the conducting organization does not provide detailed percentages for the population sample in each year.

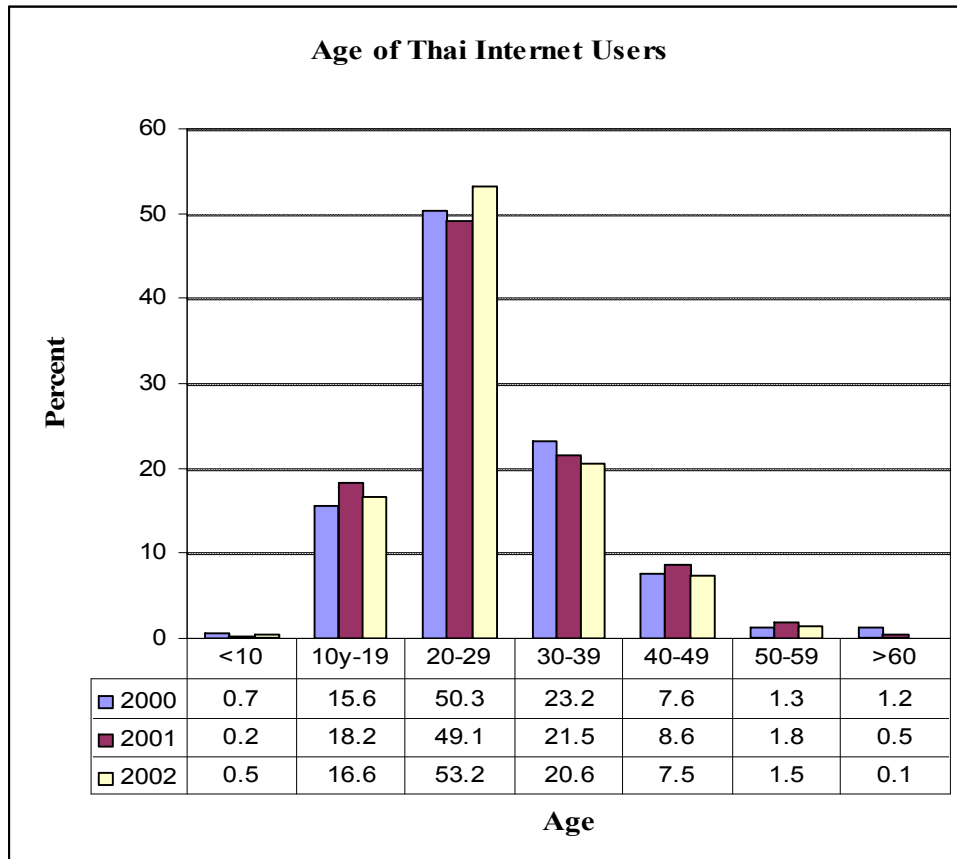
These reports have shown an interesting response pattern of on-line surveys in Thailand. The first surveys in 1999 had 2,404 respondents followed by 2,507 respondents in 2000 (NECTEC & NSTDA, 2000, 2001). Interestingly, there were 19,714 respondents in 2001 (NECTEC & NSTDA, 2002). However, there were only 15,000 respondents in 2002 (NECTEC & NSTDA, 2003a). NECTEC aims to conduct these on-line surveys annually. The survey in 2002 asked people to complete thirty-five items on Internet-based surveys. Completing this on-line questionnaire took about ten-fifteen minutes.

The purpose of this section is to detail some important demographic data of Thai Internet users. It is not strictly accurate because the survey in each year has the difference in sample sizes. Therefore, this section will outline data profiling the characteristics of those using the Internet in Thailand such as age, geographical location, gender, education level, employment, employment type, point of access, home computer ownership and favourite Internet activities.

4.2.1. Age of Thai Internet users

Figure 4.1.: Age of Thai Internet users

Source: NECTEC & NSTDA (2003a)



This bar graph (Figure 4.1.) compares the ages of Thai Internet users between 2000 and 2002. It reveals that the largest group of Thai Internet users in all years of the survey is between 20 and 29 years of age. This age group comprises about half of the Thai Internet users, 50.3 per cent in 2000, 49.1 per cent in 2001 and 53.2 per cent in 2002. The second largest group of Thai Internet users is people who are 30-39 years old. This is closely followed by 10 to 19 year olds, while those over 40 years of age show little Internet use. The age profile has shown little variation over the three years.

4.2.2. Gender of Thai Internet users

Figure 4.2.: Gender of Thai Internet users

Source: NECTEC & NSTDA (2003a)

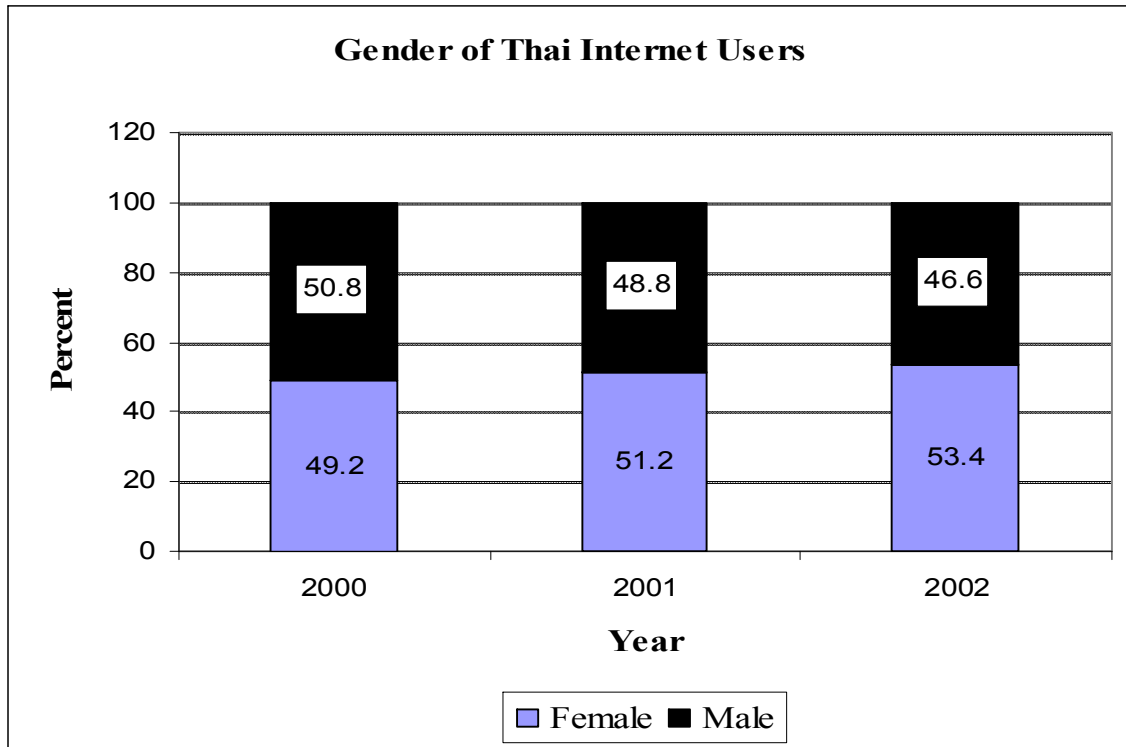
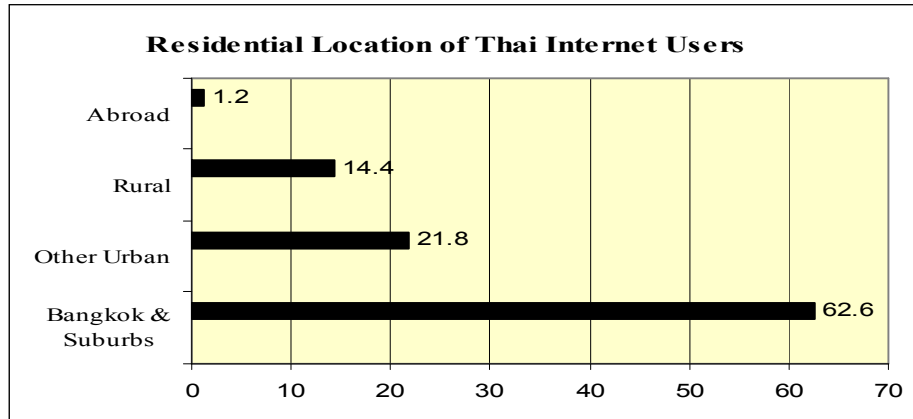


Figure 4.2. shows the gender of participants in each year. Levels of gender participation suggest little difference between the level of Internet use between males and females. There has been little variation in this over the years although recent data indicates a slightly higher and increasing level of female participation.

4.2.3. Residential location of Thai Internet users

Figure 4.3.: Geographical location of Thai Internet users

Source: NECTEC & NSTDA (2003a)

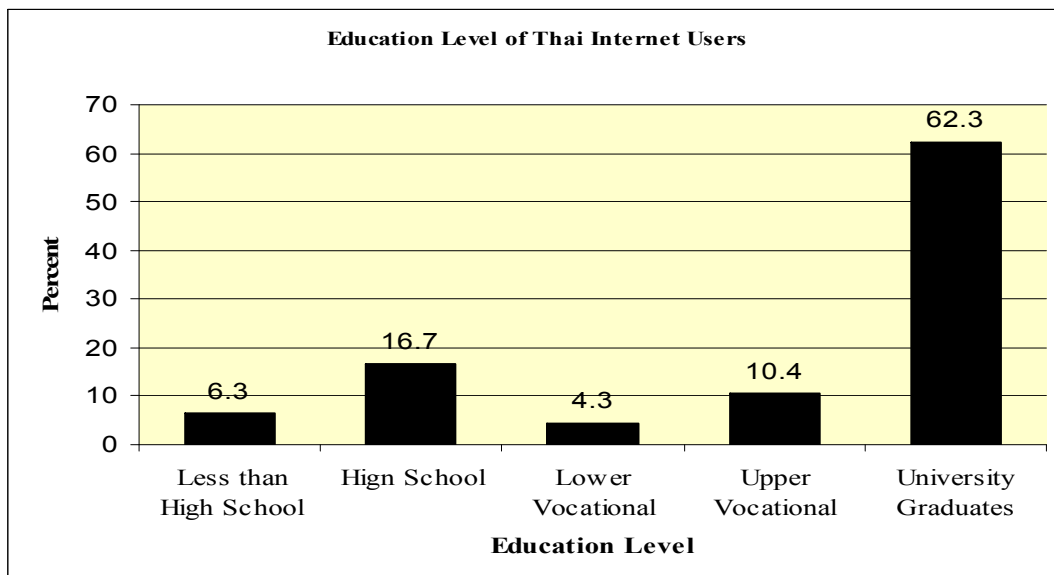


The above bar graph (Figure 4.3.) presents the residential location of Internet users in Thailand. Almost two-thirds of Thai Internet users live in Bangkok and surrounding suburbs. Furthermore, the second biggest group of users lives in other urban areas. In other words, Internet use occurs in highly urbanized areas in Thailand.

4.2.4. Educational level of Thai Internet users

Figure 4.4.: Educational level of Thai Internet users

Source: NECTEC & NSTDA (2003a)



Data relating to the education level of Thai Internet users show that the largest group of users are university graduates (62.3%) (see Figure 4.4). This number included university students in undergraduate and postgraduate programs. Many would seem to be full-time students. The second largest group of users is people studying in high schools (16.7%).

4.2.5. Employment of Thai Internet users

Figure 4.5.: Employment of Thai Internet users

Source: NECTEC & NSTDA (2003a)

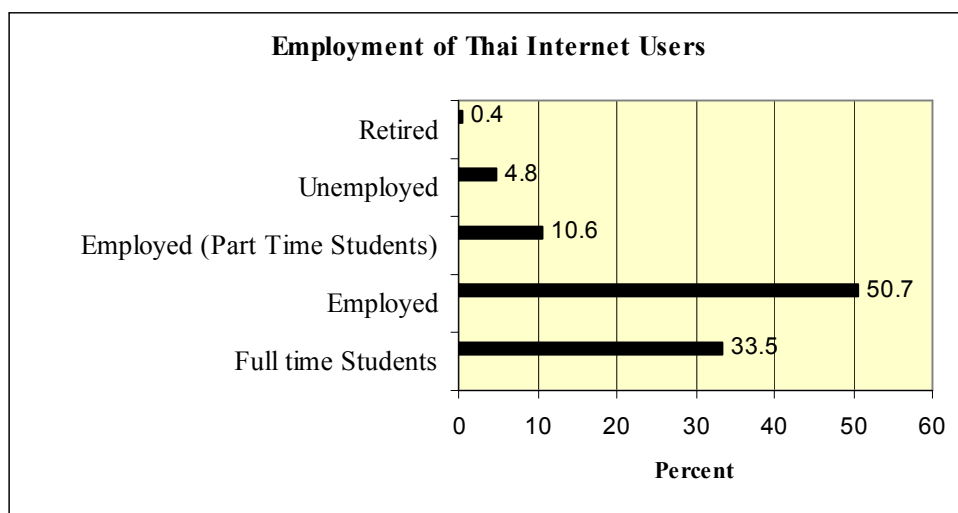


Figure 4.5. shows the largest group of Thai Internet Users are employed which included part time students and the second largest group are full time students (33.5%). This information may be evidence which supports the notion that Thais connect to the Net for work and study.

4.2.6. Employment type of Thai Internet users

Figure 4.6.: Employment type of Thai Internet users

Source: NECTEC & NSTDA (2003a)

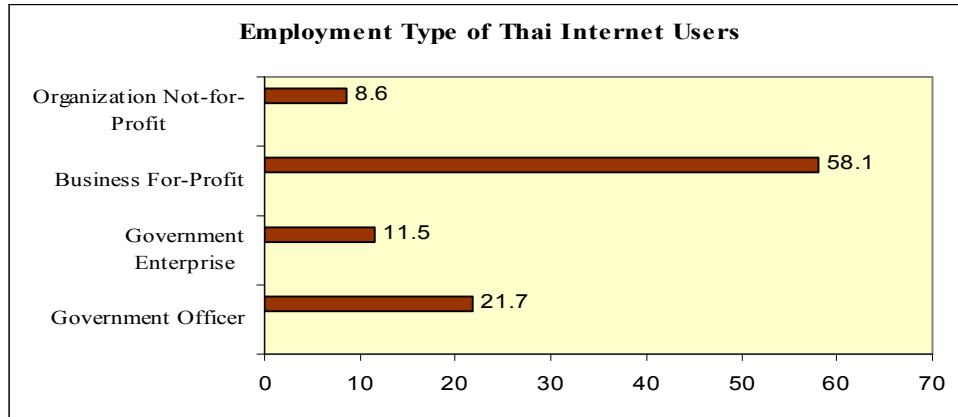
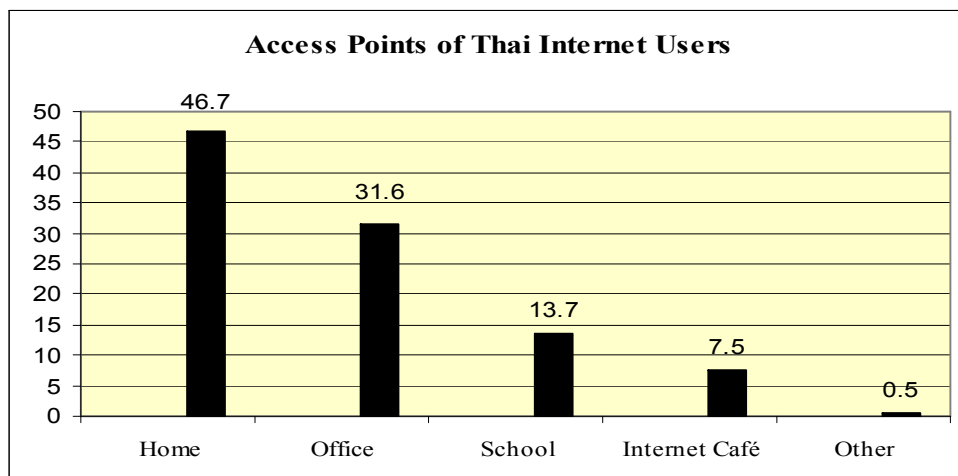


Figure 4.6 shows that almost three fifths of Thai Internet Users work in business. In addition, one fifth or the second biggest group of Thai Internet Users are government employees. The data in Figure 4.6 show that the business for-profit in Thailand is the biggest group of users. It is possible that the business for-profit Internet user group access the net for e-trading.

4.2.7. Access points of Thai Internet users

Figure 4.7.: Access points of Thai Internet users

Source: NECTEC & NSTDA (2003a)



The most frequent access points in Thailand for Internet use are connections from homes (46.7%), followed by offices (31.6%), schools (13.7%) and Internet cafés

(7.5%). However, this does not indicate clearly whether users work at home or access from a home office. The survey should provide more detail to identify the meaning of each access point.

4.2.8. Home computer ownership of Thai Internet users

Figure 4.8.: Home computer ownership of Thai Internet users

Source: NECTEC & NSTDA (2003a)

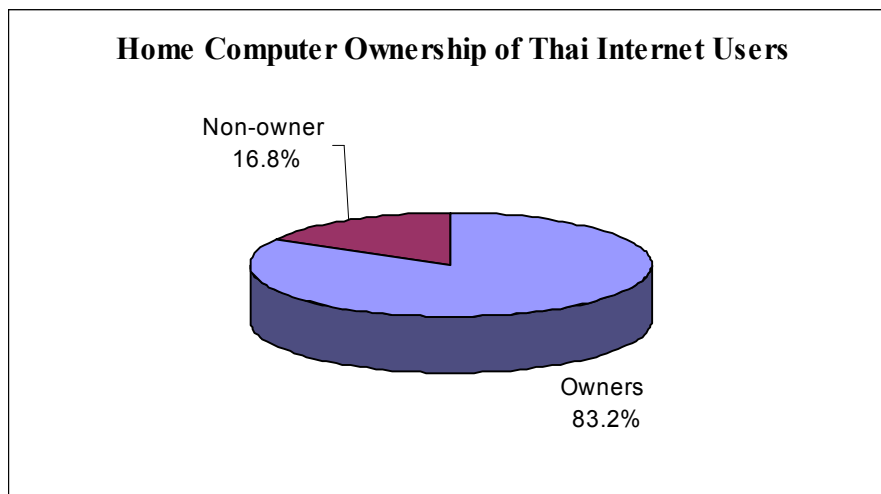
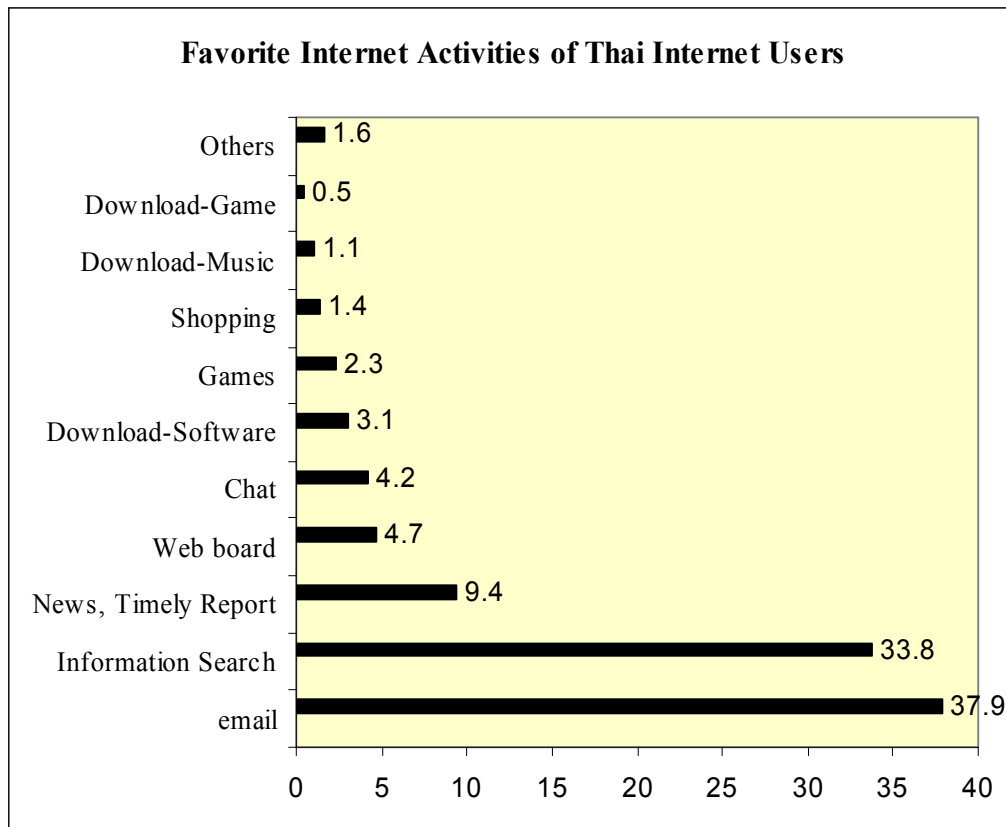


Figure 4.8. shows most participants have their own computer. However, the survey did not ascertain whether that all participants' computers connect to the Internet.

4.2.9. Favourite Internet activities of Thai Internet users

Figure 4.9.: Favorite Internet activities of Thai Internet users

Source: NECTEC & NSTDA (2003a)



To know which Internet activities occur more frequently in Thailand, multiple check box questions were included in the on-line questionnaires. Each participant can choose more than one Internet activity that he or she has (Figure 4.9.). The most favorite Internet activity of Thai Internet users is using email (37.9%) followed by searching for information (33.8%).

The profile of Thai Internet users has outlined the demographic characteristics of Thailand's Internet users. It has shown that the average age of Thai users is about 27.3 years old, somewhat equally distributed between the two genders but with a growing female participation. The majority of respondents (approximately 60%) live in Bangkok and surrounding suburbs. People who have completed a bachelors' degree are the largest group using the Internet (62.3%). Moreover, about half of Thai Internet users are employed and those using the Internet in the commercial field are also the largest group. However, the most frequent access point in Thailand is connection from

homes and the majority of Thais who use the Internet have their own computer. The most common Internet activity of Thai Internet users is to send and receive emails.

The trend of Internet usage in Thailand is growing strongly because of the Thai Government's ICT vision, especially the strategy of on-line communication (ICT Thailand, 2004). The Thai Government has a plan for using the Internet for communication; it aims at the improvement of communication infrastructure such as personal computer connectivity up to the same level as Malaysia. Moreover, the Thai Government aspires to increase Internet penetration by having more than 70 per cent of the population with access to the Internet. Additionally, the Thai Government hopes to improve the IT literacy of 60 per cent of the Thai population. Furthermore, the government will reduce the cost of connection to the net so as 80 per cent of people can pay for accessing. When and if these strategies are achieved, Thailand will be one of the leading IT countries in the Asian region.

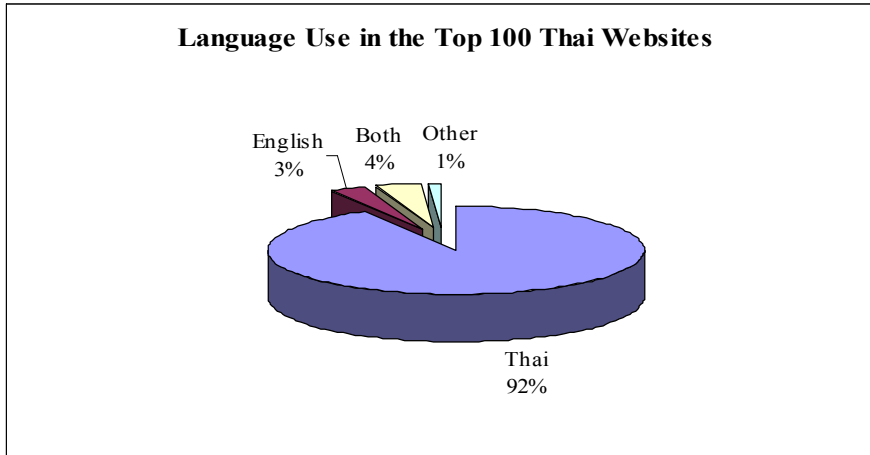
4.3. Languages usage in Thai web sites

Thailand has only one official language, Thai. Basically, media outlets in Thailand such as newspapers, magazines, television programs, and radio programs use some languages other than Thai, due to the number of foreigners living and working as well as doing their business in Thailand. The most popular second language in Thailand is English. The majority of private schools teach English from kindergarten until university. In government schools, English is taught from year five. Other languages such as German, French, Japanese, and Chinese are options that Thai students can follow when studying from year ten. Thai web sites as one kind of media are increasingly being used in communication, education, business and entertainment. This section will explore language use on Thai web sites as measured in March 2003.

4.3.1. Languages usage in the top 100 Thai web sites

Figure 4.10.: Languages use in the top 100 Thai web sites

Source: Truehits.net, (2003)



Based on a profile of the top 100 Thai web sites in March 2003, the main language used in web sites is Thai (92%); there are only three web sites that use English. However, there are four web sites that use both Thai and English. Interestingly, the web site of the Tourism Authority of Thailand (www.tat.or.th) uses 11 different languages, namely Thai, English, Japanese, Korean, German, Italian, French, Romanian, Greek, Spanish and Portuguese. The three web sites that use only English are the search engine web site at searchtarget.com, “the Nation” English newspaper at nationmultimedia.com and the entertainment web sites at starasia.net. Clearly, the target groups of these web sites are foreigners. The four web sites that use both Thai and English are the Stock Exchange of Thailand at set.or.th, the Lox Info Internet Service Provider at loxinfo.co.th, the free web board at buildboard.com and the Thai Star entertainment web sites at thaistar.net.

The possible reason explaining the trends in languages used on Thai web sites depend on their main audience. The best example is the Tourism Authority of Thailand web site that has 11 different versions. Additionally, one of the English newspapers, the Nation, uses only English to inform, while the Stock Exchange of Thailand uses both languages because its customers are both Thais and foreigners who do not understand Thai.

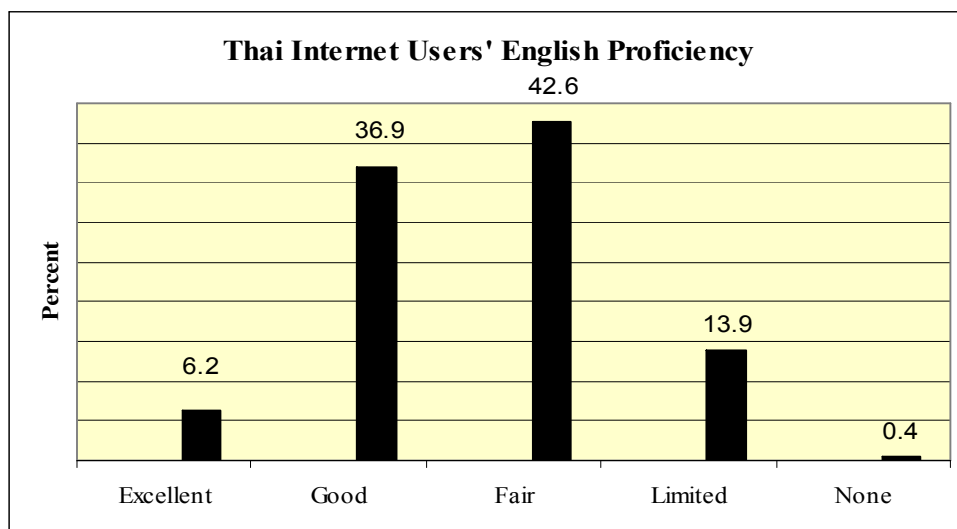
As web sites are media communicated on-line, the trend of language use in web sites relates definitely to the native languages of each country. Moreover, one of the most important rules in creating web sites that are easy to use is to operate in the user's language (Krug, 2000). Therefore it can be concluded that most Thai Internet users prefer to use web sites in Thai. Multilingual web sites are commercial web sites where foreigners are part of the audience.

Furthermore, the analysis of the top 100 Thai web sites in March 2003 gives an overview of language use in Thai web sites. One of the crucial documents that relate to the usage of English in Thailand is the survey of the National Electronics and Computer Technology Center which has conducted a survey of Thai Internet users to ask them to self-rate their English proficiency. The details are as follows.

4.3.2. English proficiency of Thai Internet users

Figure 4.11.: Thai Internet users' English proficiency

Source: NECTEC & NSTDA (2003a)



Regarding Thai Internet users' English proficiency (Figure 4.11.), a small number of respondents said that they are "excellent" in English (6.2%), while 36.9 per cent rated their English as "good". The largest group of people indicated that their English is "fair" (42.6%). The results of this survey are congruent with the finding that Thai Internet users prefer to visit web sites that use Thai to English and other languages but it also suggests that almost all Internet users have some English, however limited. Additionally, there are many Thai language search engines that work well which are

popular for Thai Internet users such as www.sanook.com and www.google.co.th. Therefore, the limitations of Thai Internet users' English proficiency do not seem to generate difficulty in searching on-line information.

4.3.3. The future trend of languages use in Thai web sites

There is evidence to support the trend of the increasing use of international languages on Thai web sites. From the researcher's view point, the growth of bilingual and multilingual web sites is increasing due to two main factors. The first factor is the audience to whom the web site is targeted. The second factor is the aim for constructing the web sites. Therefore the purpose of this section is to explore the future trend of language use in Thai web sites by outlining the features which encourage or discourage use of particular languages.

A significant factor in determining which language is used on a Thai web site is its purpose. The target groups of these bilingual or multilingual web sites are not only local people but also foreigners because tourism is the most important component in improving the economy in Thailand. The Thai government urges both Thais and foreigners to travel in Thailand all year round. Many Thai e-commerce web sites use only international languages such as those for restaurants, rental car services, souvenir shops etc. If the web site is used for commercial aims such as in tourism and for export purposes, the language is most likely to be English. As shown in the study of Thai hotel web sites content, most use English on their homepages (Siwalee, 2001). The numbers of such web sites have dramatically increased.

The purpose of web sites is the second reason for the substantial use of Thai in Thai web sites. Thai web sites are a tool for communication in society, as well as newspapers, magazines, radio programs and television programs which use Thai. If the audience is Thai, the web sites will give information in Thai. Interestingly, however, there have been mistakes when foreign companies have created a local version of some web sites because "Thai users are different and their lifestyles and behaviour need to be considered during design and development" (Yu, 2001). For example, in the researcher's experience, Thais understand "555" to mean "laughing". This is because in Thai "5" is pronounced "Ha" thus "555" will be pronounced as "Ha ha ha" which similar to laughing. However, it does not have any meaning in the western world. Most Thai culture is based on Asian style, especially in linguistic

matters. The negative question is a good example. When asking a Thai a negative question, if the answer is “yes”, it may mean “no”. This happens in other languages such as Japanese and Korean. Furthermore, similar cultural on-line peculiarities occur in other linguistic networks such as the Japanese network which uses symbols. For example, USA and European networks use :-) but Japanese networks use (^_^) for the same meaning of a regular smile (Pollack, 1996). See more networks symbols in Appendix 4.

Despite the business reasons that support using English on Thai web sites, in contrast, there are other reasons to explain why web sites in Thailand use Thai such as for technical reasons and web sites’ objectives. In technical terms, Thai script presents no problem for the Internet even though Thai uses 44 characters, including many vowels. Thai web sites have been developed, both monolingually and bilingually (in Thai and English), depending on the target groups (Yu, 2001). In 1998, Trin Tantsetthi, President of Internet Thailand, introduced a proposal to register the Thai Standard coded character set ‘TIS-620’ with the Internet Assigned Numbers Authority (IANA) as a legitimate character set for the Internet (Koanantakool, 2001).

Even though Thailand has only one official language, English is the most common foreign language used in Thai web sites because English is the only compulsory second language subject. This is similar to other countries as English is now the most widely used and studied language of the world (The Linguasphere Observatory, 2005). Another facilitator is the first on-line translating software “Par Sit”. This English-Thai Cross-Lingual Web Navigation Service, created by NECTEC, translates English web sites into Thai. The purpose of this on-line software is to assist Thais who go on-line but have limitations in understanding English. This is because English speakers are the largest group of Internet Users in the world (35.2%) (Global Reach, 2002). Moreover, much of the content used in web sites on the Internet is English (68.4%) (Global Reach, 2002). In contrast, according to Global Reach (2002a), the numbers of people who are non-English-speakers are increasing dramatically (see Appendix 5).

Definitional problems should be a concern in international surveys because some particular concepts cannot be translated or described meaningfully in some cultures (Mayer, (1980) as cited in Lang, (2005)). To control linguistic irregularities, the

methods such as “back translation” or “parallel blind translation” methods are normally used in the international questionnaire since some concepts have different meanings in different national contexts (Lang, 2005).

Therefore, it can be assumed that the most important factor in the use of English is whether the company is doing business internationally. Two factors that are likely to support the use of Thai on Thai web sites are lack of technical terms and the purposes of web sites in wanting to address a local audience. The long-term trend will be for having more bilingual and multilingual web sites while the numbers of Thai web sites will also increase rapidly.

4.4. Research of Thai Internet-based surveys

The purpose of this section is to reveal the variety of Internet-based survey research in Thailand. The information in this section has been searched from the Internet and Technical Information Access Centre or TIAC database. TIAC is a web-site of Thai theses database that have collected theses database from 1989 until 2001 of 45 institutes (TIAC, 2003).

One of the web-based surveys on Thai web sites is the almost annual report of Thai Internet user profiles by NECTEC. The 2002 online survey of NECTEC included dichotomous questions, filter questions, Guttman Scales, multiple-option questions, open-ended questions and single-choice questions. This on-line questionnaire is a scrolling page. Users have to scroll for reading by themselves. There is not a record of how many people have viewed the advertising banner. It has only the response rate.

The second research was conducted by (Keereerat, 2000). It is a comparison of response rates and accuracy in questionnaire responses on the Internet with different sending approaches, follow up techniques and contents at Chulalongkorn University in Bangkok. The sample groups consisted of 162 Chulalongkorn University undergraduate students. Use was made of the t-test statistic at .05 level for statistical significance to determine differences in the accuracy of questionnaire responses. The independent variables included two approaches (World Wide Web or ‘www’ and email), two content areas (general and interesting) and two follow-up techniques (email and chat room). The dependent variables were response rates and accuracy. The results were as follows:

1. The group which approached the questionnaires through www had an overall higher response rate (50.0%) than the group which received a questionnaire through email (15.0%),
2. There was an overall higher response rate (17.1%) to the general content questionnaire than the interesting content questionnaire (14.6%).
3. The groups which followed up through Email had a higher response rate (8.7%) than those which followed up through chat (0%).
4. The group which received the general content questionnaire through email and followed up through email had the highest response rate (11.8%). The group which received the interesting content questionnaire through email, and followed up through email had the second highest response rate (5.7%), while the groups which followed up by chat on either questionnaire had the lowest response rate (0%).
5. The group which approached the questionnaire through www had the greatest response rate to the general content questionnaire (100.0%) and the lowest response rate to the interesting content questionnaire (0%). The groups which received the general content or interesting content questionnaires through email both had the same response rate to their respective questionnaires (15.0%).
6. The difference between the level of accuracy in questionnaire responses from the group which approached the questionnaires through www and the groups which received a questionnaire through email was not statistically significant.
7. The difference between the level of accuracy in questionnaire responses from the group which responded to the general content questionnaire and the group which responded to the interesting content questionnaire was not statistically significant.
8. The difference between the level of accuracy in questionnaire from the group which received the general content questionnaire through email and followed up through email and the group which received the interesting content questionnaire through email and followed up through email was not statistically significant.

In conclusion, NECTEC have conducted an on-line survey annually since 1999. There is no report that examines the principles of Internet-based design in Thailand. The

trend of using the web-based survey in Thailand is growing as part of the overall growth in using the Internet.

4.5. Thai university

This section aims to provide general information about the population at the Thai university selected for this study. There are 13 faculties: Faculty of Education, Faculty of Humanities, Faculty of Fine Arts, Faculty of Social Science, Faculty of Physical Education, Faculty of Science, Faculty of Medicine, Faculty of Nursing, Faculty of Pharmaceutical Sciences, Faculty of Dentistry, Faculty of Health Science, Faculty of Engineering and The Graduate School.

The information from the Office of the President at this University on 10th February 2004 revealed that the total population was 14,650 people, which includes 11,768 students (Education Service Division) or 80 per cent of the university population and 2,882 staff members (Personnel Division) or 20 per cent. The group of students include 10,022 undergraduate students, 1,448 master degree students and 298 doctoral degree students. The biggest group or seven tenths of the population is undergraduate students, 10,022 students which include 3,697 (36.88%) males and 6,325 (63.11%) females (16 December, 2003). The 1,448 master degree students include 510 males and 938 females (10 February, 2004). Lastly, the 298 doctoral degree students include 118 males and 180 females (10 February, 2004). Therefore, the gender of the students at each level is not equivalent; in total, 36.75 per cent are male and 63.25 per cent are female. The university staff include 1,010 teachers, 129 administrators, 257 staff, so the total staff is 2,882 people. It should be noted that there is no record of the gender profile of university staff. The possible users of this university's web sites will include its current and recent population, prospective students and alumni.

4.6. Summary

The information presented in this chapter has shown that the proportion of Thais using the Internet is close to the average figure for the world's population. Among the countries of Southeast Asia, Thailand ranks fourth in Internet use after Singapore, Malaysia and Brunei. NECTEC has conducted its annual on-line questionnaire to collect Thai users' demographic profile since 1999. The response rate each year to the NECTEC annual on-line questionnaire is different even though the survey form and

invitation methods are similar. NECTEC themselves did not focus on the design of on-line survey form and how to persuade people to respond to the survey even though they are crucial tools in data collection. The average age of Thai Internet users is about 27.3 years old. Most Thai Internet users live in Bangkok, the capital city in Thailand. The biggest group of users are University students (62.3%) and about half of Internet users in Thailand are employed. Three-fifths of Thai Internet users work in the business sector. Additionally, nearly half of the total users connect from home and less than one-fifth of users do not own computers. The language used in most Thai web sites is Thai while English is the top foreign language. The rationale of using multilingual languages in Thai web sites is for doing business and communication with the world. This study has found that there is limited research of Internet-based surveys in Thailand. In addition, that research has focused on different purposes of study and has not researched the design of Thai Internet-based survey form principles. At the selected Thai university, seven tenths of the population are undergraduates and the female student population is more than the male on every level.

CHAPTER FIVE

RESEARCH STRATEGY AND DATA COLLECTION METHODS

This chapter describes the development and design steps of web-based surveys and examines response rates for different invitation methods among the research sample. The empirical research approach was deemed to be most appropriate in order to achieve the objectives of the research. This chapter will outline the scope of the study, the research strategy, the variables studied and the details of the data collection.

5.1. Scope of the study

This section will describe the scope of the study and examine in more detail than given previously the actual details of this study.

5.1.1. Internet-based surveys

Internet-based surveys or, in other words, web-based surveys imply a questionnaire that is displayed on www via standard browser software such as Internet Explorer, Netscape and so on. They are self-administered, scrolling, web-based questionnaire forms. The content for the web-based survey utilized for this study concerned the usage of a Thai university web site (see questions in the survey at Appendix 6 - 7). Participants were not offered any financial or other incentive when responding to the on-line questionnaire. All the Internet-based survey instruments were based on the design principles for web-based survey research as outlined in Chapters Two and Three, with the majority of principles coming from western literature. Some graphic such as the logo of the university and the tone of colours on the form are based on the university web site. The response rates which needed to be calculated are:

1. ***The click-through rate:*** the percentage of users accessing the web-based questionnaire by any of the three invitation methods
2. ***The overall completion rate:*** the percentage of participants who completed the on-line survey.
3. ***The attrition rate:*** the percentage of those who accessed the questionnaire but prematurely abandoned the on-line questionnaire.

To gauge the most effective techniques to encourage Thai university web site browsers to participate in the Internet-based survey, three types of invitation methods were created (all invitation messages were briefly explained in Chapter One, Figure 1.2.-1.4.):

- a) **An advertising marquee: a marquee on the homepage** is a message that appears on the university homepage inviting the user to complete the on-line questionnaire.
- b) **A pop up window: the window which appears when the user enters the web sites** is a small, new browser window on the users' desktop that opens automatically when users go to the university homepage.
- c) **A message box: the box which appears when the user clicks on any links on the homepage** is a small new window on the users' desktop that opens after users click on any links on the university homepage.

The researcher trialled these three methods to ascertain which one gained the highest response rate as the dependent variable.

5.1.2. The presentation of three invitation methods

The three methods presented were controlled by the Java script in HTML code. The processes of presentation were as follows:

1. The users open the browser and go to the university homepage
2. The users see the advertising marquee presented in order to persuade the users to participate in the on-line survey. Whenever and if a user clicks on the banner, the homepage will change to the Internet-based survey (also see Figure 5.1.).
3. Then, the visitor will see the pop-up window on the homepage, present for 60 seconds; it has both the buttons to start the on-line survey and the close window buttons. However, there are some computers that will not present the pop-up window because of software which restricts the pop-up window.
4. If the user clicks through the pop-up window, it will open a new window which signals the commencement of the Internet-based survey (also see Figure 5.2.).
5. Whenever the user closes the pop-up window without choosing to start the survey or for users with computers that block all pop-up windows, and when

they start clicking on any links on the homepage, the message box will alert the user to attempt persuade him/her to participate in the on-line survey. The homepage will be changed to the destiny web page even if the user decides to click on “OK” or “Cancel” (also see Figure 5.3.).

6. If the users choose ‘Cancel’, the message box will close and it will not alert the subject again even when the users need to return back to the homepage and click on other links.
7. If the users choose OK from the message box, it will open a new window which, similarly, signals the commencement of the Internet-based survey.
8. If the user comes back to the university homepage, the processes of the pop-up window and the message box will not be restarted.
9. For visitors who have responded to the web-based survey, the processes of the pop-up window and the message box will not start again because the script has been written to prevent re-submission.
10. For visitors who do not respond to the on-line survey and quit the browser, whenever the browser is opened, the processes of invitation will start working again.

The research strategy was divided into three main stages as shown in Figure 5.4. The three stages of the research were:

Stage One: Development of the content for a web-based survey

Stage Two: Identification of web-based survey design principles

Stage Three: Evaluation of the most effective invitation method

Figure 5.1.: An advertising marquee working process

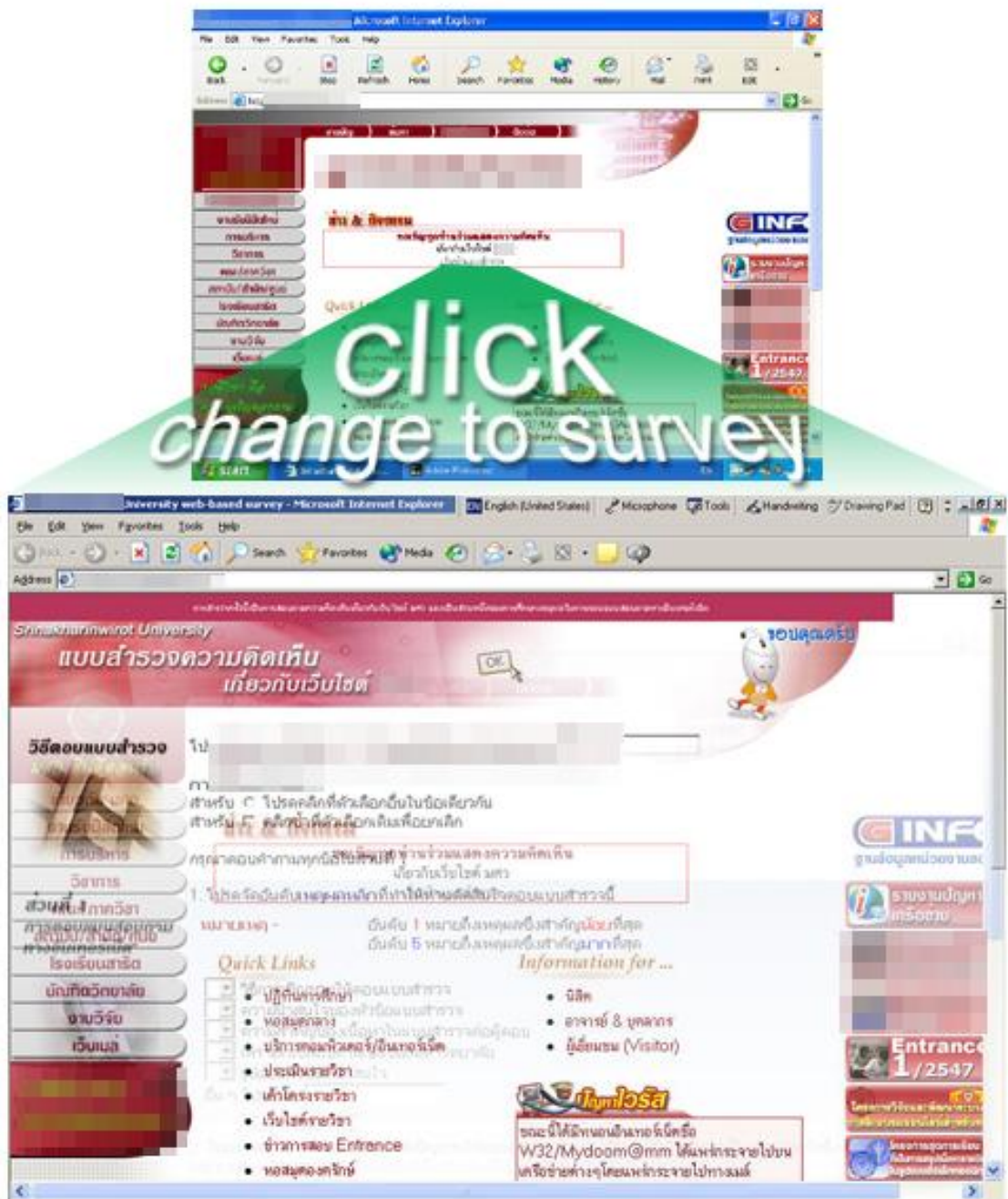


Figure 5.2.: A pop-up window working process

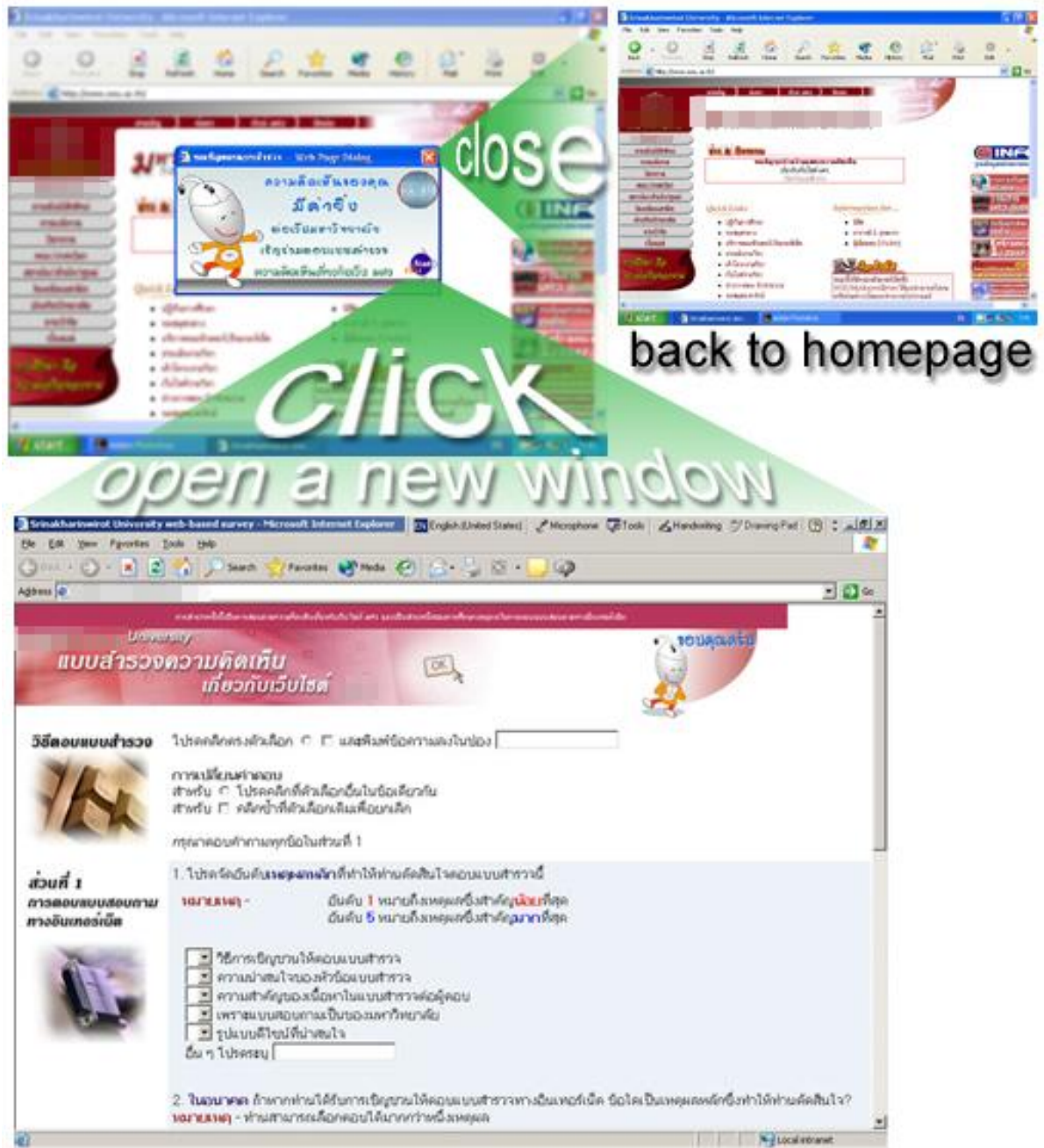
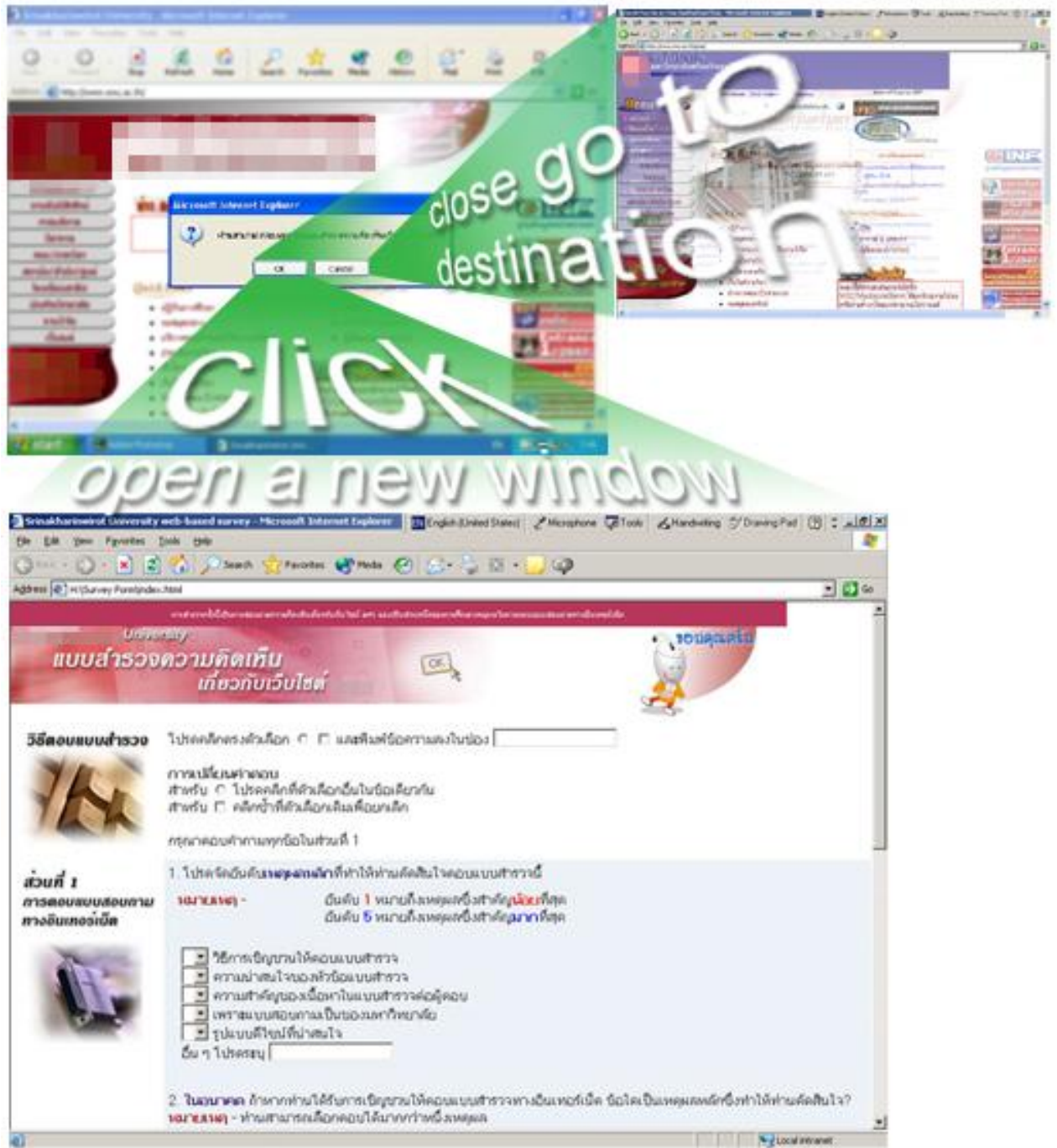
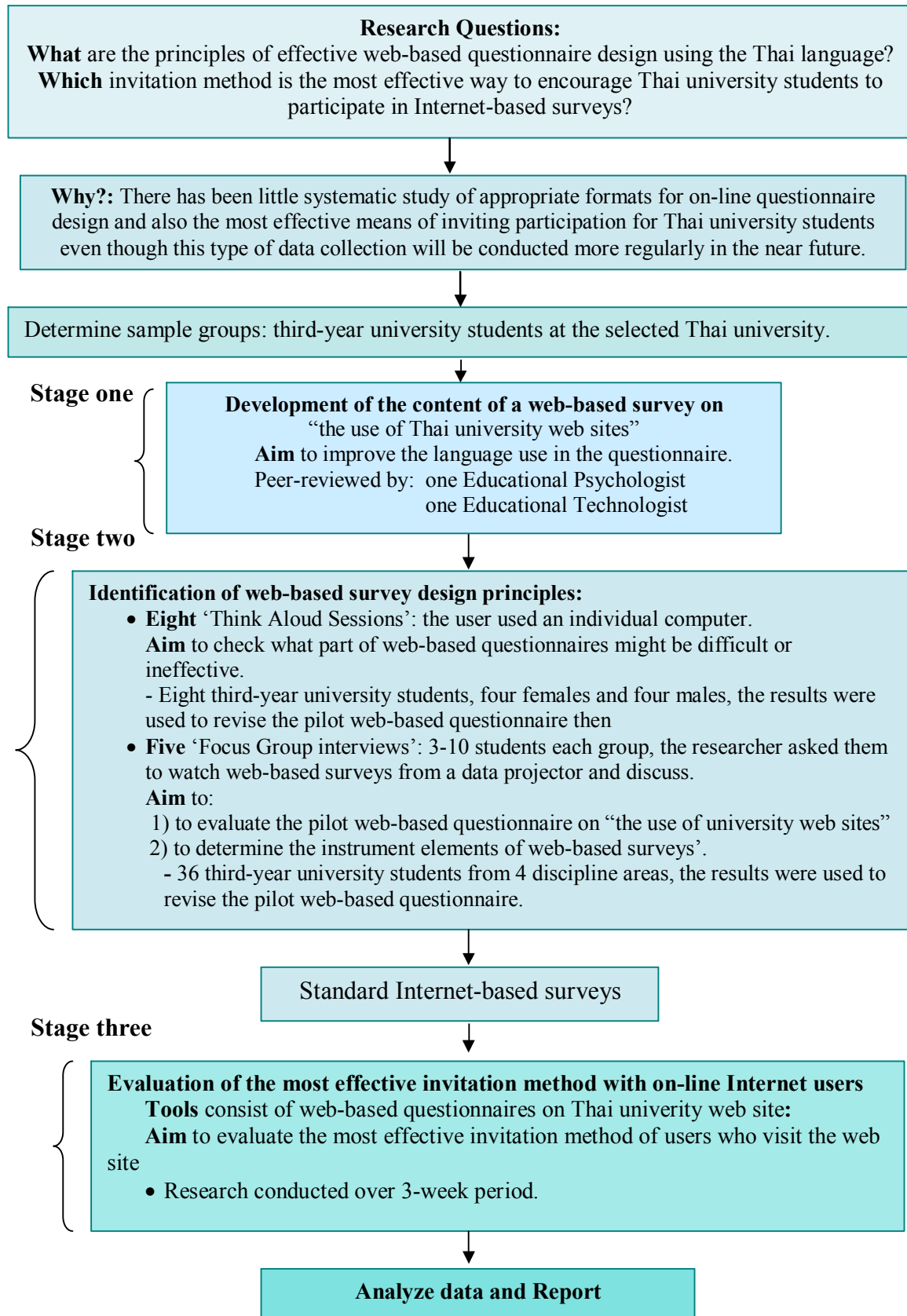


Figure 5.3.: A message box working process



5.2. Research Strategy

Figure 5.4.: Research strategy



5.3. Stage One: Development of the content for a web-based survey

The objective of Stage One was to ensure that the language used in the questionnaire was clear and comprehensible. The initial step was the creation of the web-based survey content, asking about *the usage of a Thai university web site*. The on-line survey instrument included a wide variety of questions types, including dichotomous questions, filter questions or contingency questions, rating questions, matrix questions, multiple option questions, nominal questions, open-ended questions, ordinal questions and single choice questions (see Appendix 6 for the pilot survey form). This content was peer-reviewed by four knowledgeable persons. After consultation, the researcher revised the content. After obtaining the feedback, this paper-based questionnaire was revised and translated into Thai. The Thai content was peer-reviewed by an English native speaker fluent in Thai, and also by a Thai native speaker fluent in English. After further revision, the Thai content was used for the pilot on-line questionnaire.

In November 2003, the first stage of the research strategy, developing the content for a web-based survey, was conducted and completed in Australia. The requirements for improving the language for content in the Thai version were as follows.

1. For the checklist question, add direction of “Note: you can choose more than one option”
2. Correct the typing error in the direction of section three
3. Correct meaning when translated into Thai such as friendly web site นำใช้ นำเข้าเยี่ยมชม, development พัฒนา หรือ ปรับปรุง ปัจจัย หรือ เหตุผล
4. Emphasis by change to more effective wording such as *rank* as อันดับ and *always* as เสมอ
5. Describe in more detail in the direction section
6. Eliminate ambiguities

The edited Thai content was brought to Thailand then attached with the invitation letter intended for participants at the selected university. At the university’s computer centre, the computer centre director agreed to support this study and gave details of the research requirements to a web development team and staff who manage the computer laboratories. The researcher presented the project details in Thai to the web development team director. The web development team director also wanted to make

some changes in the content of the actual survey. This is because the web developers wanted feedback from web users to improve the university web site. The change of content in the questionnaire included a reduction of items and the deployment of more specific questions targeted at groups of users.

5.3.1. Recruiting research sample

An explanatory letter containing the invitation letter to participants, which was described in the data collection processes, the number of participants required for observation and interview together with other details was sent to the Academic Affairs Vice-President office for approval and support. The Academic Affairs Vice-President office provided a formal letter in Thai to each faculty and the Computer Centre giving permission for the research. The researcher sent these letters to the Computer Centre and six faculties selected randomly from the 12 faculties: Education, Fine Arts, Humanities, Physical Education, Science, and Social Science.

The secretarial office of each faculty wrote the permission letter in Thai, which led the researcher to instructors who were teaching the third-year university students. The researcher contacted the instructors and asked for individual appointments with third-year university students.

5.3.2. Conducting research in Thai

Third-year university students studying at the Thai university were randomly selected to participate in the observations and interviews. Respondents to the survey were users who visited the Thai homepage during the conducting of the on-line questionnaire. Users were categorized as students from various years, both undergraduate and postgraduate, staff of the university, prospective students, alumni and general visitors. All research instruments were administered in Thai in order to make the participants feel more comfortable and to avoid any problems they may have had in translating. It was believed that participants would read Thai more fluently and also understand the objectives of participation more clearly. After data collection, the researcher translated all observation and interview transcripts and also some relevant documents into English.

5.3.3. Conducting ethical research

To ensure a good response rate, the researcher conducted the research, which included observation, interview and survey, in an anonymous manner. The researcher informed both face-to-face participants in observation and interview section and on-line participants in the survey section that the only interested result was aggregate responses. Moreover, the respondent's feedback did not include any personal identification.

5.4. Stage Two: Identification of web-based survey design principles

The overall objective of this second stage was to evaluate cognitive and motivational qualities of Internet-based surveys that gain high response rates and the crucial instruments of web-based survey. The purpose of this stage was:

- 1) to develop an appropriate web-based survey instrument
- 2) to identify the design principles for on-line survey instruments
- 3) to test the effectiveness of the questionnaire.

The appraisal of the effectiveness of the web-based survey instrument was conducted using two different formal web usability strategies. The first was the utilisation of the 'Think Aloud Technique' and the second involved focused group interviews. The data collected using these two strategies were then analysed.

5.4.1. Identification of design principles: Think Aloud Technique

The purpose of this stage was to identify the parts and aspects of web-based surveys that might be difficult or ineffective. The 'Think Aloud Technique' is a research technique customarily used in software computer design and development as well as being used in other forms of research such as reading strategies (Gomoll, 1992; Supriani, 2001). This technique can assist a developer to know what the user is thinking during his/her interaction with the software or web site, especially a graphic user interface. The 'Think Aloud Technique' in this current study was adapted from 'Some Techniques for Observing Users'(Gomoll, 1992). This method is particularly effective if a researcher wants to learn about how and why people have difficulty using web-based surveys because the participants are asked to verbalize their thought processes, making them available to the researcher (Gomoll, 1992). The success of this method depends on the level of participant comprehension, so the researcher must

describe the process step by step and also give the opportunity for participants to practise prior to data collection. (a step by step explanation of this technique is given in 5.4.3.).

Further, the researcher needed to observe the participants' nonverbal language and body language for analysis. Therefore, whenever the researcher sees a participant having difficulty or making mistakes as the student watches the screen and scrolls down the page, the researcher must take notes and attribute the difficulties to faulty design, but not intervene.

5.4.2. Participants of the 'Think Aloud Technique'

The participants recruited for evaluating the pilot Internet-based questionnaire by the 'Think Aloud Technique', were four female and four male third-year students who were randomly selected according to the criteria below,

- a. Third-year university students at a Thai university in Bangkok
- b. Excluding students with any physical impediment that limited their ability to use a computer

It took about 20 – 30 minutes to complete one observation. All movement on the computer screen and every word said by the participants were recorded on the same computer by Cam Studio 1.6. Then the results were summarized for assessing the effectiveness of the web-based survey instrument.

Eight third-year university students volunteered to be participants in the observation exercise; comprising one female and one male from each of four faculties: Education, Fine Arts, Humanities, and Science. The participants from each faculty came in a pair to the computer laboratory. Based on the ten-step processes of observation using the think aloud technique, the observation section was managed in ten steps (Gomoll, 1992).

5.4.3. Processes of the 'Think Aloud Technique'

The initial step of this section is to try out the pilot version of the web-based survey by observing the participants using the on-line form. This pilot version of the web-based survey is an instrument for identifying the design principles, based on the Western literature review in Chapter Three. The determined basic elements consists of consistency of layout such as colours, fonts and congruent images, navigation, text

links, and the logo of the university web sites. In addition, it included the title of the questionnaire, the page title, the content of each question, progressing bars and only a 'submit' button not a 'reset' or 'cancel' button. As the Thai script is left aligned, for consistency the logo was placed in the top left corner with the title of the questionnaire and list of question contents and answer items in a grid design. With concern about more white space, questions used a vertical arrangement. The pilot web-based survey was on one scrolling page that included four sections to assist user simplicity as listed below:

Section 1 About participating in on-line questionnaires

Section 2 About you

Section 3 About the university web site

Section 4 About the use of the university email account system

The introduction section emphasises briefly the purpose and length of the questionnaire, that is, 30 questions, and includes clear explanations of how to complete the questionnaire. This pilot web-based survey was constructed following web accessibility guidelines. There was no need to use audio and video in order to explain the contents of the questionnaire. This survey form used MS Sans Serif and set the font size to “-1” (minus 1) or 14 points (also see Figure 3.1. for comparison of different sizes of font). It was designed to be best presented on an 800 x 600 pixel screen resolution. It contained nine types of questions (see types of questions in the Appendices). The writing style of the wording of the questions and answer choices were a combination of paper-based survey and web-based writing style. (See the pilot version of the Internet-based survey in Thai and English for observation section in Appendix 6.)

The 'Think Aloud' exercise needed a laboratory equipped with computers, the appropriate software and computer screen resolution. The computers in the laboratory were set up for the observations. The researcher chose and installed CamStudio 1.6. to record activities. Desktop computer screens were 14 inch color monitors set at a resolution of 800 x 600 pixels.

5.4.3.1. Setting up the observation tasks

The researcher set up the tasks which it was expected that most users would do when they completed the on-line questionnaire. An outline of the tasks is provided below.

1. *Fill out every item in the web-based survey*
2. *Describe your reaction when first reviewing the web-based survey*
3. *Is it friendly or unfriendly?*
4. *Would you like to continue or quit the form?*
5. *Why do you want to do that?*
6. *Is the font size of the title clear?*
7. *Is the font size of the text clear?*
8. *Are the directions of the survey clear?*
9. *Is the white space between each item suitable?*
10. *Is the white space between the questions and choices suitable?*
11. *Is the language use in the survey understandable or ambiguous?*
12. *Is the direction in each section understandable or ambiguous?*
13. *How could this web-based survey be made so that it could be completed in a shorter time?*
14. *How could this web-based survey be made easier to complete?*
15. *How could this web-based survey be made so that response accuracy is increased?*
16. *Is there anything missing from the survey?*

To simulate a realistic situation, the researcher asked participants to turn off their mobile phone during the observation.

5.4.3.2. Describe the general purpose of the observation

To reduce any stress on participants, the researcher emphasised that the procedure is a test of the web-based questionnaire, not the users. The researcher said, “I am looking for aspects which make the web-based questionnaire difficult for users. If you have trouble with some of the tasks, it is the web-based survey’s fault, not yours. Don’t feel bad; that’s exactly what I’m looking for. If I can locate the trouble spots, then I can go back and improve the product.”

5.4.3.3. Tell the user that it is OK to quit at any time

The researcher informed the participants that they could quit at any time if they found themselves becoming uncomfortable. This is in accordance with sound ethical practice. No participant quit.

5.4.3.4. Talk about and demonstrate the equipment in the room

The researcher explained the purpose of the equipment for the observation, such as CamStudio, the software which would record all activities on the computer screen, the ear phone which made participant hear less noise and the microphone which would record all that the participants said.

5.4.3.5. Explanation of how to “Think Aloud”

The researcher asked users to think aloud during the observation, asking them to say aloud what comes into their minds as they do their work. The researcher told them that this is because by listening to users think and plan, the researcher would be able to examine the participants’ expectations for the web-based questionnaire, as well as the participants’ intentions and their problem solving strategies. The researcher also mentioned that it might be a little awkward at first, but that it becomes very easy once people become used to it. All they have to do is speak their thoughts as they work. If users forget to think aloud, the researcher would remind them to keep talking. The researcher also offered to demonstrate.

5.4.3.6. Explain that you will not provide help

The researcher said to the participants: “As you are working through the exercises, I will not be able to provide help or answer questions. This is because I want to create the most realistic situation possible. Even though I will not be able to answer most of your questions, please ask them anyway. I will note your questions and answer them later. When you have finished all the exercises, I will answer any questions you still have.”

5.4.3.7. Describe the tasks and introduce the web-based survey

The researcher explained what the participant should do first, second and third. The researcher gave the participants the tasks in a paper-based format. The general function of the web-based survey was described.

5.4.3.8. Ask if there are any questions before starting

Most of participants asked how long this observation would take; the researcher answered that it would take half an hour approximately. Then if the participants were ready, the observation began.

5.4.3.9. Concluding the observation

When the observation was over, the researcher asked the participants for more detail about what the researchers were trying to find out during the observation. For example, the participant said that *“It might include some images for decoration.”* After observation, the researcher asked what kinds of illustrations should be used for decorating the internet-based survey form. A participant from the Faculty of Fine Arts said *“The form will be more interesting if presented by some characters or cartoon, yes, use cartoons to reduce the too formal style of the university’s web site.”*

Before closing the observation, the researcher asked each participant that if there were any remaining questions the participant might have; however, there were no questions.

5.4.3.10. Using the results

The researcher identified trends in the users’ behaviour while participating in the Internet-based survey. After examining the scripts, the researcher summarised the important criticisms and suggestions, making a list as follows. The important findings were categorised into three groups: (1) layout, (2) typography, and (3) changing of survey elements. The results of the ‘Think Aloud Technique’ will be discussed further in Chapter Six.

5.4.4. Identification of design principles: Focus group interviews

The purpose of this stage was to identify the reasons for choosing each invitation method, what kind of web-based survey gained a high response rate, and the crucial implementations for web-based survey. Focus group interviews were conducted with five groups of three-ten students sharing a controlled experience, and responding to questions about their experience. The interview room was equipped with one data projector to present the Internet-based survey. Each group interview took about 25-30 minutes. The research presented each page of the Internet-based survey, and then the interviewees were asked to express their opinions on every aspect of the Internet-based survey.

The interview techniques used in the current study were applied from Stewart and Cash (1994) who combined both a directive approach and a nondirective approach of interview techniques. In the nondirective approach interview, the interviewer was a

passive aide and helper. The interviewees were encouraged to express their ideas and evaluate the web-based surveys since the interviewer requested advice or assistance from them. Questions used in the interview are very important elements that the researcher had to consider. The researcher used both open-ended and closed-ended questions. Additionally, a good technique for the focus group interviews is to prepare and practise various questions to ask when participants give different answers. The researcher planned the structure of questioning and also tried to elicit meaningful answers from every participant. The interviewer used clearinghouse questions for terminating the interviews by asking the participants whether there was anything still to be discussed and they would like to bring up at this time. Thus, the interviewer summarized the participants' feedback on each issue.

There were 13 questions for discussion. After the interview was completed, the research summarized the theme of each issue to revise these web-based surveys before placing them on the Internet. The objective of this stage was to find out how participants responded to the pilot questionnaire of each theme.

5.4.5. Participants of 'Focus Group Interview'

Participants in the focus group interviews were university students from 12 faculties grouped into four discipline areas: education, society and culture, health, and engineering (Bell, Bush, Nicholson, O'Brien, & Tran, 2002). The criteria for selection were that they be third-year university students at the Thai university. The third-year university students were selected randomly to participate in interview sectors. With reference to the third-year university population, the researcher calculated the number of participants who needed to be interviewed. There were a total of 36 students from five faculties: three participants from Faculty of Education, nine participants from Faculty of Humanities, six participants from Faculty of Physical Education, eight participants from Faculty of Science and ten participants from Faculty of Social Science. In each focused group interview, the researcher interviewed students that included females and males from the different faculties.

The data of these focused group interviews were recorded on a tape recorder. This assisted the researcher to identify aspects of web-based surveys that are necessary or can be ignored, such as the web sites logo, a help section, a suitable length of time to conduct the web-based surveys and so on. When the participants from each faculty

joined the group, the researcher spent a few minutes to explain the process of the interview as described below.

5.4.6. Processes of the ‘Focus Group Interview’

1. The researcher welcomed the third-year university students participating in this current study. Then the researcher explained briefly about the research objectives, stating, “This research is looking at the design of the Internet-based survey in terms of the effects that can increase the response rate, reduce the completion time required, and gain more accurate answers.” Additionally, this research also looks at the rationale of choosing different invitation methods for responding to the survey.
2. The purpose of the interview as a study to try to discover the weaknesses of the pilot web-based questionnaire was explained. Therefore, participants were told that during the interview, when they saw any mistakes or felt something that annoyed them from the on-line survey, they should let the researcher know as these were the points of interest.
3. If participants did not understand or felt confused about any questions, they were free to interrupt.
4. The researcher showed the web-based survey form using the projector, then asked participants a question and then the researcher would listen to students one by one. There would not be any true or false answers because the researcher was interested in individual attitudes. Therefore students were instructed not to feel shy to express their feelings.
5. The researcher stated that the interview would take about 25 minutes and participants could ask questions before starting.
6. The discussion/interview section was taped record for later analysis.

5.5. Stage Three: Evaluation of the most effective invitation method

The researchers used the suggestions from stage two, and the refined on-line questionnaire to create the actual survey. The web-based survey was loaded on the homepage of the Thai university for three weeks. The web-based survey was checked

against web accessibility standards and also manipulated and tested on a variety of platforms and screen sizes to ensure consistency of presentation. All three invitation methods were used every day to persuade Internet users visiting the Thai university homepage to fill in the on-line questionnaire during the allotted three-week period. The purpose of this stage was to improve result quality for the effectiveness of each invitation method as described in the two following questions.

1. Which method of invitation to participate in this web-based survey would users be the most likely to respond to?
 - a. An advertising marquee on the homepage
 - b. A pop-up window when the user enters the homepage
 - c. A message box when the user clicks on any links on the homepage
2. What do the participants think about each of the invitation methods?

5.5.1. Participants in evaluation of the most effective invitation method

The participants of the on-line Internet user evaluation were users who visited the Thai university web site during the period of the research. The researcher analysed the data from the record on a server of the University Computer Centre to check how many users decided to participate in the questionnaire and how many people filled in the on-line questionnaire according to each invitation method.

5.5.2. Analysis of the most effective invitation method

The results of on-line Internet users choosing different invitation methods or choosing none were examined by calculating the mean and percentage in regard to each invitation method. A chi-square test was used for statistical tests. The result of the most effective invitation method using exit survey techniques was calculated using SPSS software.

5.6. Summary

The methodology used in this study is an empirical research approach. To find out how the web-based survey design in this development can be used effectively with Thai university students, the researcher divided the research strategy into three stages. The first stage was the development of the content of the web-based surveys. The second stage involved identification of web-based survey design principles that the research would trial in the on-line pilot questionnaire with eight observations (eight

students) using the 'Think Aloud Technique' and six focus group interviews with a total of 36 participants. To evaluate the most effective invitation method with on-line Internet users, a web-based questionnaire was loaded on the homepage for three weeks approximately. All results were analyzed using both qualitative and quantitative research methods to identify the principles of web-based design and the preferred invitation method of Thai university students.

CHAPTER SIX

WEB-BASED SURVEY

DESIGN PRINCIPLES: RESEARCH FINDINGS

This chapter will present the research results of the second stage of the data collection process, which aimed to identify the principles of web-based survey design. It has been organized into two main themes based on each formal usability testing. The first theme will be explained and the results of the ‘Think Aloud Technique’ observations will be discussed. The second theme will be reported and the findings of ‘Focus Group interview’ discussed. Based on the processes of conducting an Internet-based survey, this chapter has been organized into four main sections: the findings of two formal usability testings including the eight observations using the ‘Think Aloud Technique,’ the five interviews using the ‘Focus group interview technique’, the recommendations from the focus group interviews, and the accessibility of the web-based questionnaire. This chapter is relevant to the design implementation of web-based surveys.

6.1. Results of the ‘Think Aloud Technique’ Observations

The ‘Think Aloud Technique’ observations were used to identify web-based survey design principles by setting eight formal usability testings. The following section details the findings from the ‘Think Aloud Technique’ observations organized around the web-based survey design categories. Generally, all participants in the “Think Aloud” sessions were teenagers; in the words of a female humanities student, “*The students who study from the first year until the fourth year are teenagers.*” One of the participants (a male humanities student) stated clearly that he had a positive attitude towards web-based surveys, saying “*I prefer to complete the Internet-based survey rather than a paper-based survey.*”

6.1.1. Issues regarding participation in on-line questionnaires

The fact that the web-based survey belonged to the university clearly influenced the students’ decision to participate. Most of them expressed a similar reason:

“I participated because this form belongs to the university.” (a female education student),

“It belongs to the university. I will participate in it, this is the only reason. In the future, if I am invited to respond to a questionnaire, the organization will impact on my decision as well.” (a female humanities student),

*“The main reason is time required to complete the form and **who** conducts the survey.”* (a female education student).

The other reason influencing the decision was whether the content of survey was relevant to participants. This was reflected in the following comments:

“I will respond to the survey whenever the content of the survey is useful to me.” (a female fine arts student),

“I should respond, I think I will respond because the officers and lecturers will take this result to improve and develop the university’s web sites.” (a female sciences student).

“To respond to any survey, it depends on the topic of the survey, its content. If it is an interest of mine, I will respond.” (a female sciences student).

The time required to download the web page was another factor that influences users’ decision to participate. A male humanities student commented, *“This form is quite long; I was worried that it takes time to download. Perhaps, I will close a window before getting all the data. I do not want to waste my time waiting for it.”* The confidential nature of the main web site also influenced the participants as this student stated that *“The overall view of this questionnaire is quite good. It might not take a long time to answer each question. I would like to suggest that I worry that the form will take quite a long time to download. If it loads at a slow speed, it will be closed before I see any information. I worry about this issue rather than the design. Also as I stated before, the university’s web site corrupts very often; for example, whenever students need to check their grade, it will corrupt. If I access from my home, perhaps it will be OK. Well, if I still need to wait, this will waste my time.”*

The difficulty of using hardware such as “a mouse” affected the user’s decision to answer or exit an on-line questionnaire. *“This mouse is not good; if I am working on a*

computer with a poor mouse like this and there is a requirement to fill in the on-line form I will leave” (a female education student).

6.1.2. The directions for questionnaires

The directions inform participants how to complete the web-based survey, and this affected the users’ opinion in different ways. For example, the first to be observed preferred the directions at the start of survey. *“Well.... it is the way to assist people to participate precisely. That is, giving clear directions at the beginning. The directions need to be explained clearly and accurately and also the language used in questions should be clear, direct, no confusion, get to the point straightaway to help people decide faster and more accurately. There needs to be directions at the start of the questionnaire.”* (a male education student). This user also preferred only brief directions in other sections, *“also the directions in each section, some directions are too long.”* (a male education student). However, other users could not understand the same directions. *“I feel confused about the direction that tries to explain how to change the choice.”* (a female education student). This also happened with other participants *“I also am confused on the direction that explains how to change options. Basically, I know how to answer and choose any options on the on-line form but after reading the directions I feel confused. It is not necessary to explain.”* (a male fine arts student).

Another participant indicated a different point of view about the directions in the pilot web-based survey. *“The directions are not necessary to be kept explaining all the time because all use similar processes. The directions may be useful for people who do not have computer literacy and perhaps it will give clear directions for everyone.”* (a male humanities student). Furthermore, he also stated that *“Providing a ‘help’ section perhaps is useful to users who have poor computer literacy.”* and *“The help section perhaps is useful only for users who rarely use computers.”*

6.1.3. Wording of questions and answers

The wordings of questions communicated directly to participants’ thinking and influenced the decision to participate as revealed during the “think aloud” procedure. The ease of wording in questions was the first priority required from participants:

“the questions used in the form are supposed to be easy and possible to answer. From the start until now, I can say that to the easy questions I can respond quicker. The question that needs to be answered by explanation requires users think about it longer.” ... “About questions, I think if questions are simple, I mean the question that asks straight forward to the point; if questions cause confusion, they can make users not want to respond anymore.” (a male education student),

“The language used in the survey affects the way of response to the survey. It needs to be short and have meaningful wording. Each item needs to be different.” (a female humanities student),

“The language used in questionnaire affects the time required to complete the form.” ... “If you want participants to answer quicker, the language used in the question needs to be easy and understandable.” (a female education student).

During the observation, the users quite carefully read the questions and interpreted each question sentence by sentence. For example, *“And also the next question is ‘if you are a *** student’... it emphasises me, only people who are in *** can answer these questions, people who are not in *** can pass these questions. The specific question such as ‘only users who are studying in university’ is better than no specific question.” (a male education student).* The same participant also said *“Well... for this question ‘The *** web site meets my needs’ - this is asking directly about people’s opinion, it is not very complex, I am not made to feel awkward in responding and can choose any items immediately.”*

This male education student also explained about the wording of answers as well. *“About the fourth section, ‘about using the university email account system’, this is easy and not complex. Frequency of checking one’s email also is a question that everyone can answer but the last item ‘rarely’. Well... perhaps, someone has checked, not frequently but the word ‘rarely’ might lead to a different meaning. Someone checks it twice a week, ten times in a month; I mean this condition seems too broad. It should specify more; it should be written down indicating how many times the email has been checked. In order to answer ‘Frequency of checking email’, it may be better to let users type in the number of times instead of choosing from the choice given. What does the last choice ‘rarely’ mean? Everyone’s understanding is not the same.*

Some difficult questions will require a longer time to think about and this may make users leave the Internet-based survey.”

Another student commented on the wording of questions and provided a different point of view, *“The sixth item ‘I find the information that I want quickly (in a few steps)’ the words in brackets, ... perhaps it is not necessary to state ‘in a few steps’.”* (a female education student).

Some wording was ambiguous but only for some users, as one participant said *“The seventh item ‘Information on the **** web site is difficult to understand’ ...does this mean the navigation is difficult or the content is difficult?”* (a female education student). This participant also stated that the ninth and the tenth questions were difficult to understand and the language very strange. Additionally, she drew attention to the problem of labelling in the Likert rating scale, *“In the five-point rating scale the word ‘not sure’ means neither agree nor disagree, I feel strange about the labelling of each option in these questions. If it needs an accurate answer, it needs to provide accurate choices; labels such as ‘not sure’ made me confused about the meaning. The misunderstandings in the survey were only wording, not navigation. Also the misunderstanding happened when I was asked about something that I have no experience about. For example ‘about using the university email account system’, I’ve never used university email so I do not understand enough to be able to answer this section.”* (a female education student).

Providing just enough possible options can make the participants feel satisfied and reduce the completion time. For example, *“About ‘why are you not using the university email service?’ ... this also is clear and offers an ‘other reason’ option that users can use to express their opinion in their own words. The ‘other’ option allows users to express their opinion in their own words - this is a good style of questioning because a participant might have an interesting idea to improve the university web site.”* (a male education student). Another respondent said that *“The step of filling in the form is quite simple and easy for me, only check and check and type in the input ... Questionnaires that provide all possible options are better than those requiring all input text for every question.”* (a male humanities student).

In conclusion, regarding the wording of the questionnaire, there were some typing errors that needed to be corrected and also some ambiguous wording needed to be changed to simpler and shorter words. In particular, the possible alternatives to a question needed to use only full forms. It could not use any abbreviated forms because the short form could make users confused about the meaning. For example,

English version:

Have you ever used the university email account system?

- Yes
- No

The Thai version reads literally:

You ever used the university email account system or not

- Yes
- No

It is normal practice in Thai that, when a formal question is written, the language uses a simple sentence, adding ‘or not’ at the end as in French. The ‘or not’ word is written as a suffix to the last word. Moreover, the “?” or question mark is not used in formal Thai writing except for a mathematical sentence such as $1+3 = ?$. The “or not” becomes problematic when linked to possible yes-no answers, so the researcher did not use ‘or not’ but used ‘?’ instead. Also to give people a clear understanding, the options were in full form as below.

The preferred Thai version:

You have ever used the university email account system?

- Have used
- Have never used

6.1.4. Typography

The format of the typography used in the questionnaire focuses on two main issues: font size and the white spaces of web-based questionnaires. The results from the observation were that the “-1” (minus one) font size of ‘Ms Sans Serif’ was appropriate for the Thai script. The participants indicated their readability regarding this font size:

“Ur, from what I have seen, the font size is OK. ... After I tried it out, I did not feel stressed to complete the form even though the font size is small, but it depends on the setting of the screen resolution.” (a male humanities student).

“The text size seems all right to me even though the font style is too formal.” ... “The text size is... I am not sure, but it looks fine for me to read and for persuading other users to respond to the questionnaire.” (a male education student).

However, about the title of the questionnaire, there was one different suggestion from other participants that *“The title should be bigger than it is.”* (a male sciences student).

The white space between the actual question and the options or items and also the white space between each question were deemed to be appropriate as indicated by most participants:

“About the appearance of the form, perhaps the white space, it might..., if the white space is too wide, perhaps it causes users who wish to participate do not feel the need to respond to the form. The too wide white space makes users bored and they do not want to participate in the questionnaire. The white space should not be so much.” (a male education student),

“The white space is sound, OK, it is clear. The language is understandable. Dividing between directions and questions is good enough. The space is appropriate. I suppose that others might feel the same.” (a female education student),

“About white space and text, it seems OK to me.” (a male humanities student).

Therefore, in conclusion, it would seem appropriate that the “-1” (minus one) font size of the Ms Sans Serif script be used for the content of Thai web-based surveys. There was no need to add more white space in order to present only one question per screen. Users preferred to view all questions continuously.

6.1.5. Progressing bar

Most participants preferred to have the progressing bar on the questionnaire *“I like the graphic that represents the process of working.”* (a female education student). The reason given by another respondent was *“the progressing bar indicates how many per*

cent of the questionnaire has already been filled in and keeps telling you at every section of questionnaire and so will inform the users about the process of working. The presenting of the working process is important.” (a male education student). However, there was one student who did not prefer this indication. *“The indicator revealing the percentage of completing is not necessary because users are going on to answer all questions.”* (a male humanities student). Therefore, based on these findings, it was decided that the progressing bar was appropriate.

6.1.6. Types of survey questions

Participants had different opinions about each type of survey questions. They explained the weaknesses and strengths of particular types of questions:

“It is the dichotomous type; this kind of question is good due to its clarity. This makes users feel it is ‘not too difficult’; these options help users answer more quickly.” ... *“About the question number three ... ‘Do you check your email at the weekend?’ Then choose ‘yes’ or ‘no’, well, this is a good question that is understandable and easy to choose. The yes-no questions are appropriate for use in the web-based survey.”* (a male education student). However, this participant had a problem with responding when asked to rank order, stating *“ ‘Rank the following university web site sections’ is a question that made me a little confused because someone will not be good at it... and also one becomes confused about the number. Well, this might allow choosing only the web page that people would like to visit. The participants perhaps click on the item. If the users feel confused about the number, what is the most important, then what is the second most important, they might leave every answer blank.”* (a male education student). Another participant felt difficultly regarding the rank order questions *“To rank something in order, it is difficult, I am confused.”* (a male sciences student).

Another problem regards the semantic differential question, *“About using the university email account system, as I look through this section, someone who does not understand or can not understand will be confused because useful is on the left and useless is on the right. But if users have experience of doing a similar examination, they might not be confused. This kind of question might cause users who see it the first time to leave it blank and misunderstand it and also not want to participate; messages such as ‘the capacity of the mail box is big’ ‘the capacity of the mail box is*

small' also might make some people confused. What does 'big' mean?" (a male education student).

Therefore, in order to reduce the problems of rank order questions, the questionnaire was redesigned plus including the menu pull down presenting only numbers instead of filling in blanks; Java Script was used for protecting users who chose the same number. Moreover, the labelling of options in semantic differential items was written more clearly and also the alt was used to explain the value when a mouse moved over that particular option (see Figure 6.1).

6.1.7. Length of questionnaires

The length of the web-based questionnaire impacted on the respondents' decision because of access to the Internet in Thailand. Users need to pay, for example, *"I think, the language used in this form is.... too long. Whenever it is long, this can cause people to not want to read it. It needs to be a short question which is easy to understand and grasp the concept."* (a male education student). Another participant indicated the same, *"This form might be too long."* (a male sciences student). However, one student responded differently, *"The length of the questionnaire, I feel that it is not too long."* (a male humanities student).

6.1.8. Graphics and the use of colour and multimedia features

This section covered the opinions of respondents about graphics and use of colour and multimedia features. The pilot web-based survey was decorated with a logo of the university with a set of images and background as used on the university's homepage. Surprisingly, all participants stated the same: there were no images decorating the form. The reason for this seems to be that all students who participated in the observations were familiar with the web sites of the university. Most participants gave a similar opinion:

"There is no image on this form. Where is the image? ... The form needs more colour in terms of decoration if you need teenagers like third year students participate." (a female fine arts student).

"The form needs to be decorated with animations. It needs to attract users more than this. The appearance of this form does not motivate or encourage users to respond." (a male fine arts student).

“I feel like there are too many texts; if I am going on the Internet and see a web page that includes lots of text like this I might not read it. It has only text, text and text, too many letters. The survey was not decorated with images; this made it lack interest. I did not see any images on this form.” (a female education student).

“I think colours of this Internet-based questionnaire are too pale and also it presents only text and text. There is no interesting response and technique. It might include some images for decoration. It looks empty as I see only text.” (a female sciences student).

The consistency of the main web site also impacted upon participants’ beliefs about web-based surveys. One of the participants stated that:

“I can say that the overall view of this questionnaire is friendly, because it looks similar to the university’s web sites.” (a male humanities student).

On the other hand, students who had a bias against the university’s web site, also felt biased against this on-line questionnaire as a participant said *“The University’s web site looks too formal. ... I need to understand the questionnaire quickly. This questionnaire is quite well organized; however, it lacks anything that motivates me to respond. It needs to encourage respondents to have to complete the form. ... The university web site should have more flexibility and respond to the demands of students rather than present itself academically.”* (a female humanities student).

Therefore, the overall impression given by the eight participants for the first pilot of the Internet-based survey was that the survey was too academic in tone. Its appearance was academic, and too similar in colour tone to the university web sites. This was because it looked academic and used a similar colour tone as the university web site. The participants wanted graphics to decorate the survey form; they did not feel that the university logo and buttons are decorations. They preferred graphics that were designed only for the survey form.

The font style and images decorating the web-based survey would motivate students to show more interest in participation:

“it should use informal font rather than the standard font.” (a female fine arts student).

“Each section should use a different background colour. ... Also it needs a beautiful background. This questionnaire looks like text on plain paper or formal report paper. ... Changing to a beautiful form with decoration would also make it look friendlier.” (a male sciences student).

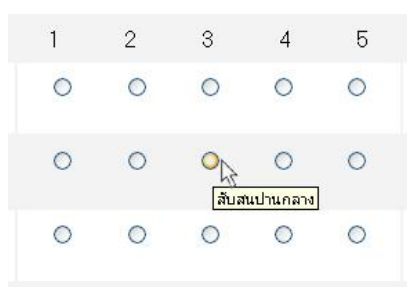
The participants also indicated to web technology in assisting users with filling in the Internet-based survey, for example:

“I think this form will be more interesting and encourage users especially teenagers with colourful and more technological techniques.” (a male fine arts student).

“I think... well... I think the survey should be... OK... let’s stimulate that when I click the area of that particular item change to other colours. This will support clearer presentation of each item.” (a male sciences student).

In addition, there was the requirement of ‘Alt’ or sometimes people familiar to call it as ‘tool tips text’, *“Whenever a cursor moves to every option, it needs to have a tool tip text to explain what that option means.”* (a male fine arts student) (see Figure 6.1).

Figure 6.1.: ‘Alt’ or tool tip text



Moreover, the rating scale question which horizontally provided and used different background colours to make each item stand out was seen to assist users to read and choose the answer more quickly. As the students expressed their opinion, *“The white and grey background is too simple.”* (a female fine arts student).

Additionally, one of the participants suggested including multimedia features to motivate users. *“It will be good, if you use an advertising style that can grasp people’s attention to look at something. Perhaps this needs to create a story that has*

actors or actresses point and explain how important the survey is. If the questionnaire can be presented by a welcoming voice and sound effects when items are clicked on, this would be fabulous.” (a male fine arts student).

In summary, there were many amendments that needed to be made to the survey form. There were two missing objects to be added. The first concerned the gender of participants. The second was the ‘thank you’ sentence at the end of the survey as suggested by a participant, *“It should say ‘Thank you for your time’ at the bottom line.”* (a male sciences student). The tone of the web-based survey should be redesigned to be suitable for the characteristics of the main groups of the population, university students who are teenagers. The progressing bar could still be used in the form. The ‘Alt’ would be added to assist users in order to indicate the meaning of options. Also, it needed to provide as many as possible items of option in order to reduce the frustration of respondents. Another important amendment was the survey form which needed to have illustrations and graphics for decoration purposes which would have made it different from the university web sites. Therefore, a cartoon as a mascot of university web-based surveys was created to invite and introduce users to the internet-based survey. Also, some figures needed to be used for decorating the Internet-based survey form.

As a result, the second pilot web-based survey form was changed based on problematic issues to include the following amendments:

- a. Illustrations with images and a cartoon
- b. Rewriting the direction section into a shorter version
- c. Changing the wording on the yes-no questions to facilitate users’ understanding.

6.2. Results of the focus group interviews

The objective of interviewing university students from five faculties was to find out the answers to the three main research questions. Firstly, what was the most effective invitation method to persuade on-line users to complete the Internet-based questionnaire and why do university students choose that particular invitation method? Secondly, what was the preferred format for a web-based survey? Lastly,

what were the elements for a web-based survey that was suitable for university students in Thailand?

All interviews were conducted in the computer laboratory, where a data projector and a computer were provided. All spoken comments made in the interview were tape recorded. The overall results were grouped around key themes.

6.2.1. Effectiveness of invitation methods

All questions in the interview were in order, based on the sequential steps of responding to the survey. Thus, the first question asked the participants to indicate the preferred invitation method. The researcher presented the three invitation methods in different orders to each interview group. This was to reduce the *recency* effect that happened when people might remember the last method rather than the earlier one (Shanks, 2005). The three invitation methods of the web-based survey were, as previously explained (see Figure 5.1. - 5.3. on page 123-125),

- an advertising marquee as big as banner size
- a pop-up window when the user enters the web site
- a message box when the user clicks on any links on the homepage.

The majority of participants (25 out of 36 or 69 % of all interviewees) agreed that when people entered the homepage a pop-up window decorated with a coloured cartoon graphic was the most effective invitation method. This would increase the respondents' interest due to two main reasons as a reduction in the formal nature of the survey by using a cartoon figure and the obvious presentation at the initial stage of visiting a homepage. As a student from the physical education faculty stated, *"it is clearly presented when entering the homepage and also it can be interesting because of color graphics."* Most respondents explained that the revised graphics made it more interesting, and it looked better than other formats. One of the respondents from the sciences faculty who preferred the pop-up window with a cartoon said *"it looks more interesting with a colour graphic. Whenever it presents only text, the invitation is boring. The cartoon makes students believe that the survey is not too formal."* Another student from the humanities faculty also said *"it looks more interesting and it only has a 'start' button. Additionally, it is decorated with a cartoon that makes it more relaxed."* Moreover, an interviewee from the social sciences faculty stated that,

“the graphics on the window make it look more interesting, beautiful.. also, more outstanding than the other methods.”

The researcher asked the interviewees who chose the pop-up window with a cartoon figure, if the pop-up window included only text without any graphics, what would be their decision about completing the survey be? All of them indicated that they would ignore the survey. The cartoon graphic persuaded them to complete the survey rather than the information. As a student from the sciences faculty indicated, “I chose it because it was an interesting graphic.” Additionally, an interviewee from the physical education faculty expressed his opinion that *“including the graphic is better.”*

Those participants not choosing the pop-up window indicated that they always ignore any messages in pop-up windows. They usually close the window before it completely downloads. Moreover, the pop-up window was imposed on them because it took space on the screen and affected other web page displays. As one of the participants from the social sciences faculty who decided to choose other invitation methods said, *“...usually I close a pop-up window before it completely downloads, so, perhaps I would not know there is an invitation to participate in the survey. I do need to get information on the web site, not on the pop-up window.”*

Only six and five participants respectively chose the advertising marquee (17%) and the message box (14%). Some had chosen the advertising marquee, indicating that it was their real intention to participate in the web-based surveys. Moreover, it seemed to be the shortest route to enter the survey. As a participant from the humanities faculty said, *“It informs directly anyone who would like to do a survey. Moreover, this seems to be the easiest way, just one click away.”* However, most of the respondents stated that the appearance of the information on the advertising marquee was not outstanding or imposing enough because the colour of the text was presented in a similar way to other text on the homepage. Additionally, since the text on advertising marquee was presented by looping, in practice, it might cause problems for users. As a respondent from the humanities faculty said, *“General users might not see an advertising marquee clearly because the entire message is looping.”*

Participants who chose the message box when they clicked on any link on the homepage indicated that it seemed to be important information. Also, this method

tried to encourage users to use the university web site. One participant from the humanities faculty who chose the message box said *“the web site tries to persuade me to do it.”* In addition, a female student from the humanities faculty said that *“Everyone sees a message box.”* Moreover, a male physical education interviewee said, *“this is better than making a link to the survey somewhere on the homepage which users can not see it clearly.”*

6.2.2. Preferred on-line questionnaire format

Web-based survey formats can be divided into at least two kinds: a scrolling page and a one item per page format. The researcher constructed these two types of web-based surveys as examples for the interviewees. The first type was a scrolling page that includes all questions on the one very long web page. The second type was one or a few items per web page, which usually did not require users to scroll down in order to respond to the next question but required clicking on a ‘next’ button instead. 25 out of 36 students (69 % of all interviewees) preferred the scrolling page since it required less clicking and was less complex. Furthermore, the respondents could continue to complete the survey and simultaneously could gauge the length of the total questionnaire. As one of participants from the humanities faculty said *“it does not look complex. I can continually complete it. I don’t want to have too many clicks.”* Another participant from the sciences faculty who chose the scrolling pages said, *“...because it uses fewer clicks. I also worry that the next page perhaps fails. The scrolling page gives enough information to assist me in terms of deciding whether to participate; if the page is long I will not participate.”*

However, there were a few participants who preferred to respond to the one item per page since each page might take a shorter time to download and also it seemed like not much work to do. The participant from the physical education faculty indicated that *“I think the one item per page.... Because it seems to be an easier way to check that I have completed all items of the questionnaire.”* Another participant from the sciences faculty also supported this view: *“I think the one item per page.... it seems more adventure; also each page will not look too long. This will give me more motivation to complete.”* Based on these comments, the most preferred on-line questionnaire format for third-year university students was the scrolling page.

6.2.3. Importance of a logo in response rates

This section provides data on whether the web site logo was important in obtaining responses to the on-line questionnaires. Almost all participants (92 % of interview participants or 33 of 36 respondents) said that the university logo or a web site logo was important because it gave more confidence to users. This might be because all participants are students from this particular university and the university logo was relevant to the topic of the questionnaire. As the reason given by a participant from the sciences faculty *“I think the general participants also need to know which organizations are providing this questionnaire.”* The logo of the organization made the survey more salient - as a respondent from the faculty of social sciences said, *“It is a symbol of guarantee from the trusted organization. Also it makes for more accurate user response. The users will have more confidence to participate in the survey.”*

Furthermore, the users will fill the form out more accurately since it was guaranteed by a trusted organization.

6.2.4. Necessity of the help section

Two thirds of the participants or 24 from 36 respondents indicated that a help section was necessary to make all users understand how to fill the form in the same direction. An interviewee from the faculty of sciences stated, *“It should have for other users, this might help people have the same understanding about directions.”* Only three of all the participants indicated that the survey needed to have the directions when it differed from other general surveys. An interviewee from the education faculty said *“Perhaps, the survey should have a help section when it requires a specific method for completion.”*

Those participants who indicated that the “help” section was not necessary expressed the view that it was simple for users who had previously used the Internet. As an interviewee from the humanities faculty said, *“it is easy to understand how to complete the form so it is not necessary to provide the help section.”* Another participant from the faculty of social sciences said *“To complete the web-based survey is a quite common activity for computer users so it does not matter whether one provides a help section.”* Also, another comment from a sciences student said

“But I think it is not necessary for university student level. They understand the clicking method.”

6.2.5. Position of demographic section

The interviewees were asked about whether the personal and demographic information should be obtained before or after completing the questionnaire. 33 from 36 (92% of interview participants) said that such information should be obtained ‘before’ completing the questionnaire. This is because the students understand that the demographic section will categorize respondents into different groups. Additionally, it was a good introduction to filling out the form since it gave participants confidence. Moreover, their understanding was that the questions at the end were either not so important or were open-ended questions. If the demographic details were asked at the end of the questionnaire, perhaps they might have previously exited the questionnaire. As participants from the social sciences faculty answered, *“It should be provided before completing the questionnaire because this section will prove whether or not the visitors are members of the target population... Basically, as I have seen at the end of other questionnaires, they provided for only unimportant question or open-ended questions. It also seems like the survey categorizes respondents... If the survey requires too many details, I’d like to leave the questionnaire at the start.”*

On the other hand, some participants indicated that the demographic details should be left till after completing the questionnaire since the most important thing was answering the questions, not collecting all the demographic details of respondents. As a participant from the education faculty said, *“I think it should be obtained ‘after’ because the most important thing is the questionnaire, not the demographics.”* Also, all participants indicated that the demographic part should not be a big section. When a survey included too many items and needed too many details, it became more likely that quitting the questionnaire would occur.

6.2.6. Requiring of private and personal information

The researcher asked the interviewees what they usually would do when the demographic section requires completing their email addresses, student ID numbers or mobile phone numbers. This was not required for wanting any reward or incentive. The reason to ask about this issue was to find out whether asking for an email address

would raise the attrition rate. More than half (about 58% of the participants or 21 from 36 respondents) said that giving their email address was fine, especially when the survey belonged to the university or, in other words, a trusted organization. Also, if they participated in other surveys on the Internet and it was an interesting topic, they will give their email address. However, if the survey belonged to a commercial web site, they would not provide their email address because they tried to avoid spam emails. As a participant from the physical education faculty said, *“It is all right if the questionnaire belongs to my university or other organization that it trusted.”* Also an education respondent stated, *“My worry is only the web sites that perhaps will take my email address for commercial use.”*

Other participants indicated that they tended to leave it blank and also some did not have an email address. As a sciences participant indicated, *“I will not give my email address because why does the survey need it. Also it depends on the situation at that time or I might give a false one.”* In another example, a participant from the physical education faculty also said, *“the problem is I do not have an email address.”*

The extended question from the previous issue asked the participants further about what students were likely to decide when the demographic section in the survey asked them to complete their ID numbers and other very personal information such as mobile phone numbers. This was also explained further that giving ID numbers can be used for data collection instead of clicking some questions asking for visitors' details such as gender, year level and faculty. The researcher questioned whether asking for private information would result in a high non-response rate. However, 70 per cent of participants would choose to quit a survey when they were asked to complete their ID numbers. The participants felt that requiring ID numbers is a too personal question. In addition, the participants were worried that perhaps it might affect their future if they expressed a negative attitude. There were similar concerns for asking for mobile phone numbers - they would not give their mobile phone numbers. As a participant from the education faculty said, *“I will leave it blank. I do not fill it in because it seems too personal.”* Additionally, another physical education participant indicated that, *“No, I am not likely to close the window. However, I will leave it blank because I worry about the effect which might happen in the future if I give a negative opinion.”*

On the other hand, the participants who perhaps would give their student ID number indicated that *“I will fill it in when it belongs to the university or other interesting organizations.”* Thus, to decrease the number of on-line participations who might quit the survey; this web-based survey did not include a question asking for the student ID number.

6.2.7. Necessity of the progressing bar

The researcher asked the participants their opinion about the progressing bar and its value in terms of knowing what percentage of the questionnaires has been completed. 25 of 36 (69 % of all participants) preferred to have the status bar as part of the survey form. As an interviewee from the humanities faculty said, *“If the form includes the status bar, the users will know the progress of their work.”* Similarly, as an interviewee from the social sciences faculty said, *“It is good to know the progress of working status.”*

One third of the participants indicated that they did not understand what it was and also it perhaps interrupts them to complete. As an interviewee from the humanities faculty said, *“It does not matter even more or less the percentage of completion, if I decide to participate.”* Sometimes it can make them feel tired if they have just started and still have a lot questions that need to be read. As a participant from the social sciences faculty said, *“The status bar is not necessary; sometimes it makes me feel tired at the start because it is a long way to go. I know by looking at the scrolling bar position. If the scrolling bar is at the top, it means I have just started. If the scrolling bar is nearly at the end of the screen it means it is close to finish.”* If the survey was on a scrolling format the university students could know the length of web page by looking at the scroll bar. As a participant from the sciences faculty said, *“It is not necessary to provide the status bar if the first section has informed respondents about the number of items and sequences of the survey. This is because I can see the length of the web page from the scroll.”* Thus, the progressing bar was not used in the web-based survey.

6.2.8. Acceptable numbers of questions

The third year university students were asked to indicate approximately the highest number of items that could be included without impacting negatively on completion.

23 of the 36 or two thirds of participants estimated that the survey should not include more than 20 items. Ten participants (27.8 % of all interviewees) indicated a limit of not more than 15 items. And the three remaining interviewees (8.3 % of all interviewees) stated that they would complete a survey form with more than 20 items.

6.2.9. Acceptable time for completing a web-based survey

This issue was also an extended question flowing from the previous question, asking about the maximum time that respondents would be willing to spend completing an on-line survey. 17 of the 36 students - or nearly half of them - indicated that the acceptable duration would be about five minutes. 13 students (36.1 % of all interviewees) said about ten minutes while only six participants (16.7 % of all interviewees) stated that they would be willing to spend about 20 minutes or it would depend on the topic.

6.2.10. Requiring of forgotten response items

The other situation asked of the students was what they would do when surveys required completing an item that the participants had not responded to. All participants indicated that if they had forgotten, they would complete those particular items. As indicated by several students from the humanities faculty, *“If the topic of the survey is interesting and relevant to me, I will answer it.”* And a student from the social sciences faculty said that, *“if it is a difficult question, I perhaps will decide to close the window. If it is not too difficult I will return to complete that particular item. In the other situation, if I have nearly finished answering; I will go back and complete it.”*

Additionally, students explained further that usually they do not complete questions that were too personal or pertain to sensitive topics or difficult areas and were likely to quit the web-based questionnaire in these cases. As the student from the physical education faculty said, *“If I forgot to do something, then I would go back to complete it, but if the questionnaire requires information that I do not want to give such as an email address I will close the window.”* Moreover, an interviewee from the sciences faculty said, *“If I forget something and then the survey requires it, I will return to complete the survey. However, if it requires very personal information such as ID number or too difficult questions that I do not want to answer, I will quit the Internet-based survey.”*

6.2.11. Problems of using response icons in a web-based survey

Before asking the interviewees about problems related to using different types of questions, it was crucial to find out about the problems of using response icons in a web-based survey. The students were asked to indicate problems of using three common response icons of a web-based survey: an option or radio button, a check box and a drop-down menu (see Figure 6.2.).

Figure 6.2.: Response icons of a web-based survey

Unchecked icons	Checked icons
<p>1. Please choose one item from a below list</p> <p><input type="radio"/> Option button or Radio button</p> <p><input type="radio"/> Option button or Radio button</p> <p><input type="radio"/> Option button or Radio button</p> <p>2. Please choose all that apply</p> <p><input type="checkbox"/> Check box</p> <p><input type="checkbox"/> Check box</p> <p><input type="checkbox"/> Check box</p> <p>3. Please indicate your answer from this drop-down menu</p> <div><p>Please choose one choice from the list ▾</p><p>Please choose one choice from the list</p><p>Answer No.1</p><p>Answer No.2</p><p>Answer No.3</p></div>	<p>1. Please choose one item from a below list</p> <p><input type="radio"/> Option button or Radio button</p> <p><input checked="" type="radio"/> Option button or Radio button</p> <p><input type="radio"/> Option button or Radio button</p> <p>2. Please choose all that apply</p> <p><input checked="" type="checkbox"/> Check box</p> <p><input checked="" type="checkbox"/> Check box</p> <p><input checked="" type="checkbox"/> Check box</p> <p>3. Please indicate your answer from this drop-down menu</p> <div><p>Please choose one choice from the list ▾</p><p>Please choose one choice from the list</p><p>Answer No.1</p><p>Answer No.2</p><p>Answer No.3</p></div>

All of the participants indicated that they had a clear understanding of these three response icons of web-based surveys because they were common functions in completing a form on the Internet.

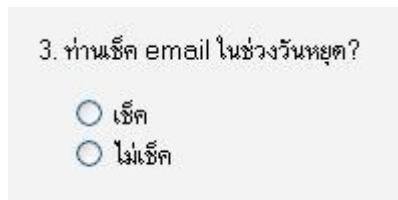
6.2.12. Problems of using different types of questions

The researcher presented each type of question commonly used in student surveys and asked them to indicate problems and their causes.

6.2.12.1. Dichotomous questions

Figure 6.3.: Dichotomous questions

The real example:



3. ท่านเช็ค email ในช่วงวันหยุด?

เช็ค

ไม่เช็ค

Meaning in English: 3. Do you check email during holidays or vacations?

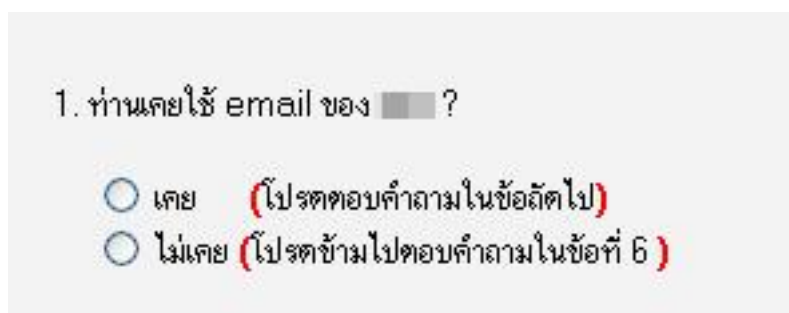
- Yes
- No

Most participants said that there is no problem responding to a dichotomous question because of the ease of decision. However, one issue that should be emphasised was to make sure that the question included all possible options. There were not only black and white areas; perhaps the right answer was grey. As an interviewee from the humanities faculty said, *“There is one problem, that is, the answer option does not cover all possible answers. It should have more options.”* Moreover, an interviewee from the education faculty indicated similarly, *“There is not a problem whenever the question includes all possible options... It can be frustrating when my answer is not ‘yes’ or ‘no’ because my answer is ‘others’.”*

6.2.12.2. Filter questions

Figure 6.4.: Filter questions

The real example:



1. ท่านเคยใช้ email ของ [redacted] ?

เคย (โปรดตอบคำถามในข้อถัดไป)

ไม่เคย (โปรดข้ามไปตอบคำถามในข้อที่ 6)

Meaning in English: 1. Have you ever used the university email account system?

- Ever (answer the next question)
- Never (go to question no. 6)

The way university students in Thailand responded to the filter question or the contingency question was similar to dichotomous questions. The filter question was used in the on-line survey form because it was easy to understand and there was no confusion about the optional choice. However, the respondents had indicated that the preferred style of the filter question was the skip function which assisted respondents to reach the next question automatically. Since a student from the humanities faculty said, *“I can say that it can make participants confused to ‘go to other questions’. I might forget to skip. I prefer the questionnaire provide a skip function.”* Furthermore, a social sciences participant said, *“No, there is not a problem if the program generates the option for me. I think the technology can easily assist this.”*

6.2.12.3. Rating scale questions

Figure 6.5.: Rating scale questions

The real example:

คำถาม	เห็นด้วยอย่างยิ่ง	เห็นด้วย	ไม่แน่ใจ	ไม่เห็นด้วย	ไม่เห็นด้วยอย่างยิ่ง
2. ฉันพบข้อมูลซึ่งเป็นประโยชน์ต่อการศึกษาของฉัน	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. สามารถพบข้อมูลที่ต้องการได้ง่าย	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Meaning in English:

Questions	Strongly agree	Agree	Not sure	Disagree	Strongly disagree
2. I always find information relevant to my study	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. It is easy for me to find the information I wanted	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Most respondents indicated that there was difficulty in responding to a five point rating scale. The reasons for this were, firstly, difficulty of the decision and, secondly, understanding the meaning of the five options. Usually, responding to the five point scale for a statement requires longer time for thinking than other question types. As a physical education student said, *“This type of question takes time to think through.”* Similarly, a sciences student stated, *“This type of question takes time to analyse and it is difficult to decide between strongly agree and agree.”* Also a humanities student said, *“I do not like this kind of question because it will take a longer time to decide.”*

It happened that the students might choose only ‘the middle option’ rather than reading through the statements or quitting the web-based survey if the questionnaire provides many statements using a five point scale. In addition, some statements in the lists were not suitable with the same scale but it was put into the same list. If the statements were difficult and ambiguous, the students perhaps leave them blank. As a sciences student said, *“Whenever surveys provide a five-scale rating, I usually choose only neutral.”* Moreover, a social sciences student indicated, *“Usually, I might choose only neutral rather than what I really think. Exceptionally, I really agree or disagree in that particular question. It should have only two sizes – black and white. I can not be sure that the degree of difference between “Strongly agree” and “Agree” is the same as the difference between “Agree” and “Neutral”. The label is very important also.”* Furthermore, a physical education student said, *“Whenever I see the five scale items in the long questionnaire I am likely to quit the survey.”*

Most of the participants also questioned the difference in the degrees of meanings among the five points. As a student from the humanities faculty said, *“I do not like five point scales and they also are confused about the meaning of the labels. What is the difference between ‘agree’ and ‘strongly agree’, ‘strongly disagree’ and ‘disagree’? What is a measurement system of agrees or disagrees?”* Similarly, a student from sciences faculty stated that, *“My opinion is the degree between each option is nearly the same.”* A physical education student summarised the general feeling, *“It is difficult to decide between strongly agree and agree.”*

The researcher asked them how to restrict these problems - surprisingly, there was unanimity in the suggestion to restrict it to three-point scales. They also thought that ‘the three point rating’ was sufficient when the questionnaire requires people to indicate their opinion. For example, a physical education student said, *“It would be better to provide only three points on the scale.”* Similarly, a student from the science faculty said, *“It would be better to have about three points.”*

6.2.12.4. Matrix questions

Figure 6.6.: Matrix questions

The real example:

5. บ่อยครั้งแค่ไหนที่ท่านใช้ email ของ ████████ เพื่อประโยชน์ทางการศึกษา ตามวัตถุประสงค์ต่อไปนี้

	ไม่ เคย	1	2	3	4	5	6	7	บ่อย มาก
รายการ		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
ส่งการบ้านถึงอาจารย์		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
ส่งรายงานถึงอาจารย์		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Meaning in English:

5. For your study, how often do you use the university email for the following purposes?

Lists	Never						Very frequently
	1	2	3	4	5	6	7
Send homework	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Send report	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

The matrix question elicited similar attitudes as the rating scales but responses were more negative. All participants indicated that it was difficult even from an education participant who felt that the previous five-point scales were fine. As she stated, *“This type of question makes me confused because of the labelling of the options. It is difficult to answer; I do not like the matrix question.”* In addition, a student from the physical education faculty indicated that, *“They are also difficult to answer; I do not like the matrix question.”* Moreover, a participant from the faculty of sciences said, *“This is also difficult to answer; I do not like this type of question. When it asks about frequency it is acceptable. I think this type of question makes me confused.”*

The problem was making the decision as to what was the best option in each question and what was the difference between each degree. As an interviewee from the humanities faculty indicated, *“That is causing more trouble. This is more complex than the five-point scale rating. The difficulty is degree of each option, what exactly it*

means.” The number on each label of the verbal matrix question caused university students more confusion. Some participants suggested that if it needed to be asked, every option should be labelled clearly. As a student from the social sciences faculty said, “This is difficult to decide. I am likely to leave it blank. Especially, the question asking about frequency, I can not understand clearly about the different meaning of each level from one to seven. It will be better to classify the meaning of frequency on each label.”

6.2.12.5. Multiple option questions

Figure 6.7.: Multiple option questions

The real example:

1. โปรดเลือกเหตุผลหลักที่ทำให้ท่านตัดสินใจตอบแบบสอบถามนี้?
หมายเหตุ - ท่านสามารถเลือกตอบได้มากกว่าหนึ่งเหตุผล

- วิธีการเชิญชวนให้ตอบแบบสอบถาม
- ประเด็นของแบบสอบถาม
- ความสำคัญของเนื้อหาในแบบสอบถามต่อผู้ตอบ
- เพราะแบบสอบถามเป็นของมหาวิทยาลัย

อื่น ๆ

Meaning in English: 1. Why are you responding to this questionnaire?

Note - You can make more than one option

- Invitation methods
 - Interesting topics
 - The importance of the survey content
 - Because this is a university survey
- Others

All interviewees indicated that there was no problem in using multiple option questions in the on-line questionnaire. Both interviewees from the humanities faculty and sciences faculty stated the same, “They are okay. I know that I can choose all that apply.” Furthermore, a participant from social sciences stated similarly, “They are easy to answer.” Also an education student indicated the same, “They are easy to understand.”

6.2.12.6. Ordinal questions

Figure 6.8.: Ordinal questions

The real example:

โปรดตอบคำถามต่อไปนี้ หากท่านกำลังศึกษาอยู่ใน

18. โปรดจัดอันดับการเข้าชมส่วนต่างๆ ของ เว็บไซต์ตามความถี่ของการใช้ จากมากที่สุดไปยังน้อยที่สุด

หมายเหตุ - อันดับ 1 หมายถึงใช้บ่อยที่สุด อันดับ 9 หมายถึงใช้น้อยที่สุด

- ปฏิทินทางวิชาการ
- ห้องสมุดกลาง
- การประเมินรายวิชา
- โครงการพัฒนาการเรียนการสอนทางอินเทอร์เน็ต
- เว็บไซต์รายวิชา
- หลักสูตร
- วัติตทัศน์ตามประสงค์
- ข่าว และเหตุการณ์
- ตรวจสอบผลการเรียน

Meaning in English:

18. Please rank the following university web site sections from most frequently used to least frequently used

Note: 1 is the most frequently used, 10 is the least frequently used.

- Academic Calendar
- Central Library
- Course Evaluation
- Course Syllabus
- Course Web sites
- Curriculum
- Video on Demand
- News and Events
- Checking grade

Participants also indicated that they did not like such ordinal questions because this kind of question required much more time to complete. As a humanities student said,

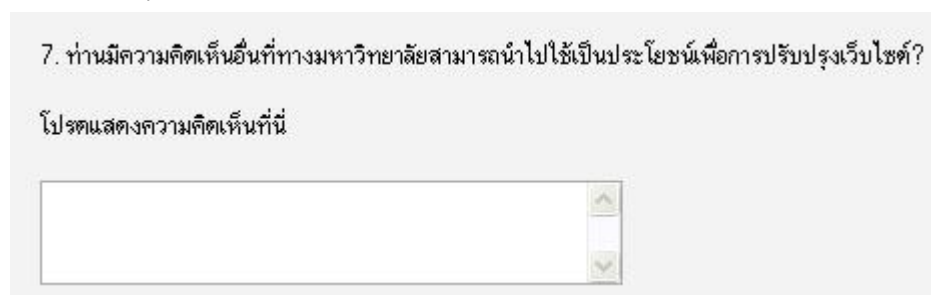
"I don't like them. They take time to think and rethink." Similarly to a sciences interviewee, *"I don't like them. They take time to think about."* The problems encountered in completing ordinal questions were a) too many answer options provided for question and b) the participants might have difficulty in interpreting the meaning of every answer option. This was especially so when there were more than ten options on the list and since all the options could not be seen on the one screen and one needs to scroll up - down before deciding. As a social sciences student said, *"it should not provide too long lists. It is difficult to read and remember them, and then order them."* Additionally, a student from the faculty of education said, *"it should be less than ten options."*

Another issue also surfaced. Some participants indicated that they knew only about some of the options, not all. Hence, sometimes they randomly number rather than tried to express their real opinions. As a humanities student also said, *"I can say that sometimes I do not understand some options that have been provided. So I just do it without care."* A physical education student also indicated his opinion that required technology assistance, *"Sometimes or perhaps rarely, I like to complete, but I prefer to order each item, I mean it should be a list of numbers in the drop-down box that I can select after I judge them, especially the long lists."*

6.2.12.7. Open-ended questions

Figure 6.9.: Open-ended questions

The real example:



7. ท่านมีความคิดเห็นอื่นที่ทางมหาวิทยาลัยสามารถนำไปใช้เป็นประโยชน์เพื่อการปรับปรุงเว็บไซต์?
โปรดแสดงความคิดเห็นที่นี่

Meaning in English:

Could you comment on how to improve the content of university's web site?

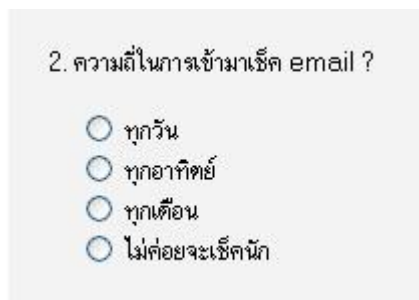
Please indicate your opinion here.

All students who participated in the ‘Focus group interview’ clearly understood how to complete an open-ended question. However, almost all participants tended to leave it blank except for the questions that they were very interested in. As a student from the social sciences faculty stated, “*Actually, I do not like to answer the ‘open-ended questions’.*” In addition, a student from humanities faculty said, “*if I am interested in the topic of the questionnaires, then I will complete them.*” Similarly, a physical education interviewee indicated “*Only the interesting topics.*” Furthermore, a respondent from the sciences faculty said, “*If I am interested in the topic of the questionnaires I will complete it.*”

6.2.12.8. Single option questions

Figure 6.10.: Single option questions

The real example:



2. ความถี่ในกาหเข้ามาเช็ค email ?

- ทุกวัน
- ทุกอาทิตย์
- ทุกเดือน
- ไม่ค่อยจะเช็คนัก

Meaning in English: 2. How often do you check email?

- daily
- weekly
- monthly
- rarely

All participants indicated unambiguously that they understood how to respond to single option questions and there was no problem associated with them.

6.3. Recommendations from focused group interview

The design of the web-based surveys was also based on recommendations from the focused group interviews. The survey was designed to have a simple layout using a straightforward navigation strategy, each section decorated with images, graphics and colours similar to the university web site in an effort to add credibility to the survey as well as to keep downloading time as short as possible. There was no progressing bar included in the web-based questionnaire because the length of web pages was quite short since users could easily scroll up and down to see all information very quickly.

The survey was divided into two scrolling pages, the first page containing two parts: participation in a web-based survey which asked two questions and the demographic part which asked two questions; the second page, the usage of the university web site survey had 16 questions, based on five user types: students, staff, prospective students, alumni and general public, having a “submit” button on each page. If the respondent abandoned the survey, the data from the first page were not lost. When a

survey was completed, the respondent was immediately thanked and notified that his/her survey was successfully completed. Giving an email address was an option for users who were interested in receiving the survey results and the survey did not require any student ID number.

The first page of the survey began with a single line introduction at the top to explain the survey purpose that was, “This is a university web site survey and a study of participation in the web-based questionnaire”. Then it was followed by the university name, the mascot and brief and understandable directions. The status bar displaying what percentage of the questionnaires had been completed was not included since there were only 18 items in total which took less than ten minutes approximately to complete. To reduce the complexity of responding, there was no requirement to complete all items of the questionnaire. The on-line questionnaire included dichotomous questions, filter questions, multiple option questions, open-ended questions, ordinal questions and single option questions. Also the rating question provided only three scales and there was no matrix question. Additionally, the ‘Alt’ or ‘tool tip text’ was provided on each radio button, check box, text field or text box and all images for clearer explanation about the meaning of icons. Adjusting ‘Alt’ also assisted both users with disabilities and common users as indicated in one of the web accessibility guidelines. (Figures of two pages of Internet-based surveys is in Appendix 7)

The software backend used for constructing the web-based survey form was Macromedia Dreamweaver 4. The mascot cartoon was drawn from Macromedia Freehand 10, and images decorating the form were retouched by Adobe Photoshop 6.0. Active Server Pages (ASP) is a language script to collect both coded and open-ended responses to the database on the server with Microsoft Office Access. The web-based survey functioned with “cookie” technology to prevent multiple submissions from the same computer.

6.4. Accessibility of web-based questionnaire

The researcher created the web-based questionnaire based on the Web Content Accessibility Guidelines 1.0 by the World Wide Web Consortium (W3C) (Chisholm et al., 1999). Also before locating it on the Internet, it was checked by “WebXACT”, a free on-line service for testing pages of web content for quality, accessibility and

privacy issues. The Internet-based survey which was used in this current study passed “priority 1” of the automatic checkpoint on Web Content Accessibility Guidelines 1.0 (See Appendix 8).

6.5. Summary

The suggestions made in the two research experiment procedures were used to improve the web-based survey that would be conducted for data collection on the Internet. The findings from the ‘Think Aloud Technique’ observations indicated that all participants who happened to be teenage university students had positive thoughts about responding to a web-based survey. These university students were likely to complete any survey conducted by their university and other organizations they found interesting. The style for writing the directions in a survey needed to be clear and to use as less words as possible. The wording of questions and the type of answer required were the major concerns for completing a survey. The first priority was that the survey needs to be easy to understand because respondents would need to read everything contained in the questionnaire. Another concern was, for example, to avoid ambiguous wording. Moreover, to reduce the time of completion, there was a need to provide enough possible options in many closed-ended questions. Regarding typography, the “-1” font size of Ms Sans Serif or 14 pixels in Thai was acceptable for the survey content. Also, there was no need to add more white space in order to present only one question per screen because users prefer to view all questions continuously. Almost all types of questions can be used in the questionnaire; however there were some types of questions that needed to be redesigned, for example, rank order questions, five-point rating scales, matrix questions and semantic differential questions. Computer technology could be utilised to assist in reducing errors of response such as in the rank order questions where users prefer to choose numbers from the pull down menu instead of inserting a number. Moreover, the labelling of options in semantic differential questions needs to be written clearly and also to be included was tool tip text for explanation of the value when a mouse was over that particular option. The use of graphics, of colour and multimedia features, according to the data, influence the motivation of respondents to complete the questionnaire. An important amendment was that the survey form needed to have illustrations and graphics for decoration purposes which differed from university web sites. Therefore, it was suggested a cartoon as a mascot of university web-based surveys be created to

invite and introduce users to the internet-based survey. Also some figures needed to be used to decorate the Internet-based survey form.

The findings from the interviews with the university students from five faculties were related to the objectives of the three main research questions. Firstly, the most effective invitation method to persuade on-line users to complete the Internet-based questionnaire was, when the user enters the web site, the pop-up window with a cartoon graphic. The reason for this was the university students prefer the graphic mode rather than the text-only mode.

Secondly, the preferred format for the web-based survey was the scrolling page rather than one item per page due to its less complex structure and it requiring less clicking. The last question focused on the structure of a web-based survey for university students in Thailand. It was discovered from the participants that the demographic information should be obtained before completing the rest of the questionnaire. The logo of the web site was important in obtaining accurate responses to the on-line questionnaire. And it was necessary to provide a help section for completing the on-line questionnaire. Asking to complete their own email address was acceptable but users were most likely to close the window when the survey requires ID numbers. Additionally, the students preferred the survey that included the status bar which was valuable in terms of knowing what percentage of the questionnaire had been completed. The approximate number of items to facilitate completion was about 20 items and the maximum time that respondents were willing to spend to complete an on-line survey was about five to ten minutes. Moreover, the survey programming should provide a reminder to users who forget to fill any items. Lastly, the Internet-based survey could include basic icons of forms: a check box, an option button or a radio button and a drop-down menu.

Eight different types of questions were considered in relation to overcome any problem of completion, and to gauge the suitability for use in on-line questionnaires for university students in Thailand. Six were found to be suitable: dichotomous questions, filter questions, multiple option questions, open-ended questions, ordinal questions and single option questions. Two types of questions presented difficulty for university students in Thailand. The first type was the five-point scale rating question

- the scale should be reduced to three points: agree, neutral and disagree. The second type was the matrix question which users found difficult to answer.

CHAPTER SEVEN

THE MOST EFFECTIVE INVITATION METHOD: RESEARCH FINDINGS

This chapter will present the quantitative research results of the third stage of the data collection process: the evaluation of the most effective invitation method for participating in the Internet survey. It has been organized into five main sections based on the data analysis. The first section describes the profile of the respondents. The second section provides an overview of the response rates to the Internet-based survey. The third section reports on the participants' rationale which influenced their response to the on-line survey. The fourth section details the factors affecting future participation in any on-line survey. Lastly, the fifth section elaborates on the daily response rates to the survey. The overall purpose of this chapter is to identify the most effective invitation method for persuading respondents to participate in web-based surveys.

The Thai university graciously donated space on their homepage to promote the survey to current and prospective users. The three invitation methods were presented synchronously on the homepage of the university. These methods, as outlined previously, were an advertising marquee in banner size or 468 x 60 pixels, secondly, a pop-up window with a cartoon which popped up when the user entered the web site and, lastly, a message box when the user clicked on any links on the homepage.

7.1. Profile of respondents

The profile of the 3,848 respondents showed it was comprised of 68 per cent females and 32 per cent males as shown in Table 7.1. The percentage of female respondents in each invitation method was more than half of all respondents (Table 7.1). This was congruent with the profile of the selected university population which had more females than males (see Chapter Four). This provided some security that the sample of 3,848 respondents reflected the university community. Additionally, this evidence supported this Internet-based survey to have less coverage error and non-response error.

Table 7.1.: Gender of respondents

Gender of respondents	Invitation Methods ordered by presentation						Total	
	Ad. Marquee		Pop-up window		Message box		N	%
	N	%	N	%	N	%	N	%
Female	49	59	933	67.2	1,636	68.9	2,618	68
Male	34	41	456	32.8	740	31.1	1,230	32
Total	83	100	1,389	100	2,376	100	3,848	100
Total	2.2 %		36.1 %		61.7 %		100 %	

As Table 7.2. shows, the sample was comprised of 1,261 students (32.8%), 1,097 prospective students (28.5%), 840 general web site visitors (21.8%), 400 university staff (10.8%) and 250 alumni (6.5%). The two biggest groups of respondents, namely the university students and prospective students (61.3 % of respondents) represented the target group of the survey since the research was focused on Thai university students as the main users of this Thai university's web site. The regular users such as undergraduate students and the university staff made the decision to access the web-based survey from a pop-up window rather than a message box. This matched the interviewees' opinions gained from the focus group interviews that a pop-up window with a cartoon was more effective than other invitation methods.

Table 7.2.: User types of respondents

User types	Invitation Methods ordered by presentation						Total	
	Ad. Marquee		Pop-up window		Message box		N	%
	N	%	N	%	N	%	N	%
Students								
Bachelor	28	82.4	506	81.5	479	79.4	1,013	80.5
Master	6	17.6	101	16.1	113	18.6	220	17.4
Doctoral	0	0	15	2.4	13	2	28	2.1
	100		100		100		100	
Students total	34	41	622	44.8	605	25.5	1,261	32.8
Staff	14	16.9	228	16.4	158	6.6	400	10.4
Prospective	11	13.3	247	17.8	839	35.3	1,097	28.5
Alumni	8	9.6	95	6.8	147	6.2	250	6.5
Visitors	16	19.3	197	14.2	627	26.4	840	21.8
Total	83	100	1,389	100	2,376	100	3,848	100
Total	2.2 %		36.1 %		61.7 %		100 %	

Contrary to this pattern, the other type of respondents such as prospective students, alumni and general visitors, preferred to entrance the web-based survey from a message box rather than a pop-up window. In particular, the two types of visitors who visited the university web site irregularly, namely, prospective students or visitors, very much preferred to click-through the message box rather than the pop-up window - 247 prospective students chose the pop-up window whereas there were more than three times or 839 prospective students who chose the message box. Similarly, there were 197 visitors who chose the pop-up window as against 627 visitors who chose the message box. This evidence suggested that the irregular visitor might think that the topic of the survey together with the use of the university's web site was not important or relevant to them and so ignored a clear invitation on the pop-up window. However, when the irregular users clicked on any links on the homepage, a message box clearly invited them again to participate in the survey again, and this might affect their decision.

7.2. Overall response rates

To improve the quality of research responses and results on the most effective invitation method for participation in Internet surveys and reduce the coverage error of such surveys, the use of the Thai university web site survey was monitored for 22 days from 26th January to 16th February 2004. The total click-through rate from the three invitation methods was 16,941 times, which led to 22.7 per cent of respondents completing the survey, or a click-through rate to completion of 3,848 actual responses (see details of response rate to each invitation method in Table 7.3.).

Table 7.3.: Overall response rate of Internet-based survey

Character of response	Invitation methods ordered by presentation						Total	
	Ad. marquee		Pop-up window		Message box		N	%
	N	%	N	%	N	%	N	%
Survey completed	83	52.2	1,389	32.8	2,376	19	3,848	22.7
Survey not completed	76	47.8	2,843	67.2	10,174	81	13,093	77.3
Click-through total	159	100	4,232	100	12,550	100	16,941	100
	0.9 %		25 %		74.1 %		100 %	

7.2.1. Click-through rate

Information regarding the overall response to the Internet-based survey revealed at the end of conducting the survey, the click-through total rate was 16,941 from the three invitation methods (see Table 7.3.). Ordered by the response rate, 74.1 per cent of participants or 12,550 chose the message box, 25 per cent of participants or 4,232 chose the pop-up window and 0.9 per cent of participants or 159 chose the advertising marquee.

The response pattern was converse to the invitation order. This might be explained as users trying to ignore the survey until finally succumbing to the third invitation. However, the survey attempted to persuade users to participate by presenting different invitation options. Additionally, the obviousness of invitations might affect users' decisions to enter the survey. The advertising marquee was a passive method and the barrier of the pop-up window was the block pop-up window application embedded in the users' browsers. Therefore, it seemed that because the message box was seen by every user when they clicked on any link on the homepage, the message box derived the highest click-through rate.

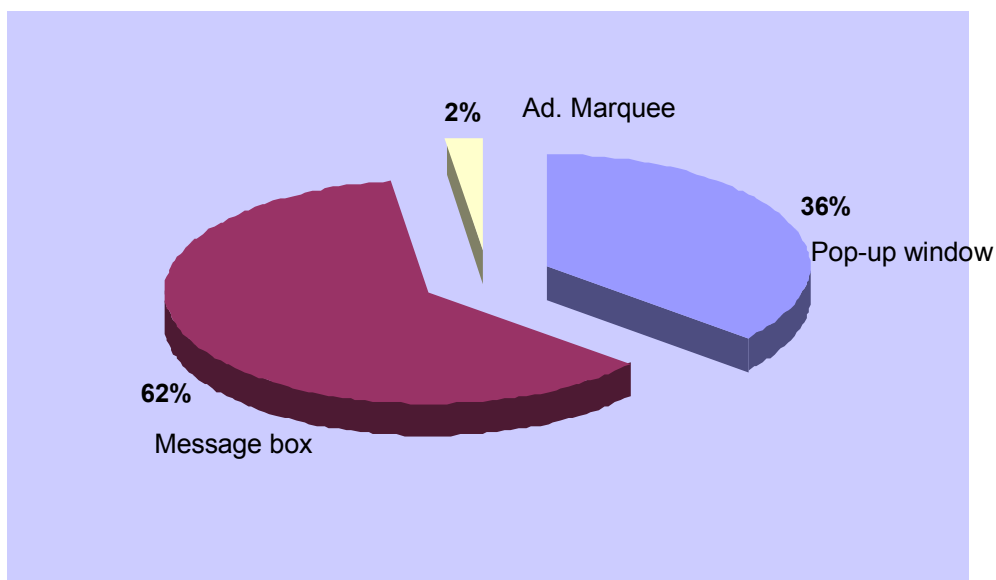
To test the statistical significance of choosing the different invitation methods, a chi-square test was conducted. The statistical comparison of the response rates revealed that the message box was significantly more popular than the other two methods at a significance level of .001.

7.2.2. Survey completion rate

Referring to the overall response rate in Table 7.3., the number of respondents who completed the survey was almost a quarter, or 22.7 per cent of the total click-through rate or 3,848 users. The largest group of users who filled out the survey were participants who entered in response to the message box, which accounted for nearly one fifth or 19 per cent of users or 2,376 participants. 32.8 per cent of users or 1,389 participants who chose the pop-up windows completed the survey. About 50 per cent of users or 83 participants who clicked-through the advertising marquee completed the survey. These results suggest two possibilities: the impact of the message box in increasing the number of responses even if, as a proportion, it is the highest of the three methods or the impact of the number of actual invitation methods, perhaps irrespective of the type of method.

The total proportion of respondents who did not complete the survey was about three quarters or 77.3 per cent or 13,093 users of all respondents who clicked-through the three invitations (see Table 7.3.). The largest group of users who quit the survey were participants who entranced the survey through the message box - this was 81 per cent of users. The equivalent figures respectively for the pop-up window and the advertising marquee were 67.2 per cent and 47.8 per cent. The comparison data for the overall survey completion rates for the three invitation rates are illustrated in Figure 7.1.

Figure 7.1.: Comparison of survey completed rate



The biggest group of users, that was about three fifths or 61.7 per cent of users or 2,376 participants who completed the survey, were users who chose the message box (see Figure 7.1.). Almost two fifths or 36.1 per cent of users who completed the survey (1,389 participants) were users who entranced the survey through the pop-up window. Only 2.2 per cent of users who completed the survey or 83 participants were users who clicked-through the advertising marquee. The percentages of users who clicked-through the advertising marquee were not comparable to the other two invitation methods. According to this evidence, the advertising marquee perhaps would not be a valuable invitation method for users of Thai university web sites in further surveys although this may be because it was the first method presented. In comparison with all experimental invitation methods, the most effective invitation method was the message box because it gathered the highest response rate though

again this may be because it was the third invitation. The rationales of participants for their decisions to choose a particular invitation method will be reported on in Section 7.3.

7.3. The most important reasons influencing responses to the on-line survey

Table 7.4.: Reasons influencing response to web-based survey

The decision for responding to this survey Respondents were asked to rank numbers indicated their decision reason, one means the least important five means the most important	Average rate on each item of three invitation methods			Total (n=3,848)
	Ad. Marquee (n =83)	Pop-up window (n=1,389)	Message box (n=2,376)	
Invitation methods to respond the survey	3.08 (4)	3.06 (4)	3.25 (2)	3.18 (3)
Interesting survey topics	3.22 (3)	3.18 (3)	3.27 (1)	3.24 (1)
The importance of the survey content	3.26 (2)	3.19 (2)	3.19 (3)	3.19 (2)
Because this is a university survey	3.42 (1)	3.25 (1)	3.02 (4)	3.11 (4)
The interesting survey presentation	2.11 (5)	2.38 (5)	2.32 (5)	2.34 (5)

The figures in brackets are referring to the rank order of rationale for the response.

The first question on the web-based survey asked users about their decision to participate in the survey. Two groups of respondents, those who clicked-through the advertising marquee and those who chose the pop-up window, both indicated that the most significant reason relevant to their decision to participate was the actual organization that was presenting the survey (3.42 and 3.25 respectively), followed by the importance of the survey content, interesting survey topics, the invitation methods used to gain a response the survey and the interesting survey presentation. However, the group of participants who chose the message box indicated that ‘the topics of the survey’ was the most important reason relevant to their decision (3.27). This was also congruent with the most frequent reason given in the “other” section which was summed in the comment: “Actually, the web site needs to be improved”. In other words, people tended to respond to the Internet-based survey when the issue was relevant to their needs. In total, however, “the topics of the survey” was ranked as the most important reason influencing users’ decisions (3.24) followed by the importance of the survey content (3.19) and the invitation method to respond to the survey (3.18). The presentation of the survey was ranked as the least important reason for participation in the survey as indicated by all groups of participants. This also can

imply that users of the university web site did not focus on the presentation of the invitation to participate in the survey but rather the survey topics.

7.4. The most influential factor affecting future decision participation

Table 7.5.: Factors effecting future decision participation

Factors affecting decision participation.	Frequency rate on each item of three invitation methods			Total (n=3,848)
	Ad. Marquee (n =83)	Pop-up window (n=1,389)	Message box (n=2,376)	
Invitation methods to respond to the survey	34 (4)	567 (4)	1,120 (4)	1,721 (4)
Interesting survey topics	55 (1)	900 (1)	1,558 (1)	2,513 (1)
The importance of the survey content	52 (2)	844 (2)	1,392 (2)	2,288 (2)
Because this is a university survey	25 (6)	449 (7)	736 (7)	1,210 (7)
The interesting survey presentation	26 (5)	501 (5)	919 (5)	1,446 (5)
Special rewards	17 (8)	376 (8)	606 (8)	999 (8)
Time required completing the questionnaire	23 (7)	497 (6)	887 (6)	1,407 (6)
The benefit for respondents	43 (3)	819 (3)	1,222 (3)	2,084 (3)

The figures in brackets are referring to the rank order of rationale for the response.

The survey also asked respondents about the factors that would influence any decision whether to participate in the future. Each respondent could nominate none, one, several or all nominated factors. Each ticked factor was allocated one point for the analysis. Each respondent nominated an average of 3.55 factors. The results were highly consistent over all these different invitation groups, particularly for the top five reasons affecting the decision to participate in an on-line survey: (1) interesting survey topics, (2) the importance of the survey content, (3) the benefit for respondents, (4) invitation methods to respond to the survey and (5) interesting survey presentation (see Table 7.5.). All participants who completed the survey indicated that the least influential factor was ‘Special rewards’. This data set highlighted the importance of the nature of the survey topic if high response rates were to be gained.

7.5. Daily respondent rates

Table 7.6.: Daily response rates

Day	Invitation Methods ordered by presentation									Total		
	Ad. Marquee			Pop-up window			Message box			Click	Complete	%
	Click	Complete	%	Click	Complete	%	Click	Complete	%			
1* Mon	13	8	61.5	230	96	41.7	420	89	21.2	663	193	5
2 Tue	22	10	45.5	632	246	38.9	1,192	251	21.1	1,846	507	13.2
3 Wed	21	12	57.1	269	87	32.3	792	149	18.8	1,082	248	6.4
4 Thu	8	4	50	275	97	35.3	770	142	18.4	1,053	243	6.3
5 Fri	5	2	40	228	83	36.4	708	128	18.1	941	213	5.5
6 Sat	11	7	63.6	157	52	33.1	422	98	23.2	590	157	4.1
7 Sun	0	0	0	118	49	41.5	338	89	26.3	456	138	3.6
Average % per week			53			37			21			44.2
8 Mon	11	3	27.3	209	59	28.2	677	138	20.4	897	200	5.2
9 Tue	6	4	66.7	191	57	29.8	627	120	19.1	824	181	4.7
10 Wed	7	4	57.1	182	60	33	709	121	17.1	898	185	4.8
11 Thu	2	1	50	193	54	28	607	79	13	802	134	3.5
12 Fri	6	2	33.3	188	56	29.8	648	112	17.3	842	170	4.4
13 Sat	6	6	100	122	39	32	368	77	20.9	496	122	3.2
14 Sun	2	1	50	89	26	29.2	295	63	21.4	386	90	2.3
Average per week			54.9			30			18.5			28.1
15 Mon	6	2	33.3	166	51	30.7	544	86	15.8	716	139	3.6
16 Tue	2	1	50	150	44	29.3	573	99	17.3	725	144	3.7
17 Wed	4	2	50	144	47	32.6	531	96	18.1	679	145	3.8
18 Thu	4	2	50	144	32	22.2	529	91	17.2	677	125	3.2
19 Fri	8	3	37.5	182	54	29.7	514	90	17.5	704	147	3.8
20 Sat	3	2	66.7	111	28	25.2	372	85	22.8	486	115	3
21 Sun	5	2	40	168	54	32.1	557	113	20.3	730	169	4.4
22**Mon	7	5	71.4	84	18	21.4	357	60	16.8	448	83	2.2
Average per week			49.9			27.9			18.2			27.7
Total	159	83	52.2	4,232	1,389	32.8	12,550	2,376	18.9	16,941	3,848	100

* from 4 pm to midnight (9 hours), ** until 5 pm or 17 hours

On the first day, the survey started to record only from 4 pm to midnight because the server was down from Monday morning. However, the rate of responding per hour on the first day achieved the highest response rate which was 21.4 responses per hour

(193 divided by 9 hours). The rate of responding per hour on the second day was not significantly different at 21.1 responses per hour. In comparing the completion rate of the pop-up window and the message box on the first two days, it showed similar ratings which were about ten responses per hour on each invitation method (96 and 89 from 9 hours, 246 and 251 from 24 hours). Even though the pop-up window and the message box both presented differently, each had similar effectiveness on the first two days in terms of persuading users to respond to the survey.

Even though the number of users who chose the pop-up window was less than users who chose a message box, the percentage of users who completed the survey from a pop-up window was higher than the percentage of users who completed the survey from a message box for every day (see Table 7.6.). This evidence indicated that the users of the university web site decided to click-through from a message box invitation more than a pop-up window. However, the high click-through rate from a message box did not produce a high response rate as the same as a pop-up window did. Additionally, it could be assumed that users of this Thai university web site who clicked-through a pop-up window had stronger intentions to complete the survey rather than those who clicked-through a message box. In other words, users might accidentally have clicked-through a message box due to unfamiliarity with the new technology and then made the second decision to leave the survey.

The rate of responding became lower about half way on the third day of the survey that was 507 times on the second day as compared to 248 times on the third day. One thing that happened on all three weeks of the survey was the total click-through rate and completion rate on weekends was lower than the total click-through rate and completion rate on weekday (see the highlighted area on Table 7.6). This was because the university web site had more visitors on weekdays than at weekends. In a comparison of completion rates over the three weeks of the survey, the average completion rate of the first week was the highest completion rate (44.1 %) followed by the second week (28.1 %) and the third week (27.7 %).

About the weekly response rates, the average completion rate from a pop-up window with cartoon had been reduced from the first week to the third week respectively which was congruent with the normal and general situation of the survey. Interestingly, the weekly average completion rate from a message box had been

reduced slightly from the first week (21 %) to second week (18.5 %) and then remained stable between the second week (18.5 %) and the third week (18.2 %). This can be one of reasons supporting the message box as an effective invitation method in the future, because the interest in this method from users of university web sites remained almost the same even though it had been used for three weeks.

7.6. Summary

Chapter Seven has presented the results of the third stage of the data collection processes. The gender of the survey sample was not equivalent as 68 per cent were females and 32 per cent were males, generally reflecting the gender profile of the whole university community. The most effective invitation method for the Internet survey in this current study was a message box which appeared when users clicked on any links on the homepage. This finding has been analysed from data recorded on the web site server of this Thai university for the 22 days from 26th of January to 16th of February 2004. The overall response patterns for the Internet-based survey showed that the completion rate of this particular survey was 22.7 per cent of the total click-through rate.

In comparing the survey completion rate across the three experimental invitation methods, a message box was the best method of invitation because not only did it gather the highest click-through rate but it also produced the highest completion rate. In sampling the users of the Thai university web site, it was found that the most important reason influencing users' decisions, and the factors affecting their decision to participate in any future surveys were "topics of the survey" followed by the importance of the survey content. For participation in this survey, the invitation methods were the third reason influencing users' decisions. In the future, 'the benefit for respondents' was the third factor affecting the users' decision.

Critically, regarding the completion rate across the three weeks of the survey, the average completion rate reduced from the first week to the third week, a normal situation in conducting a survey. Interestingly, the weekly average completion rate from a message box reduced slightly from the first week to the second week and then remained stable between the second and third week. This is also an additional reason supporting the message box as an effective invitation method in the future.

CHAPTER EIGHT

DISCUSSION AND CONCLUSIONS

This chapter eight will present discussion of the current study's findings based upon the qualitative and quantitative analysis as presented in Chapters Six and Seven. The discussion content will link Internet-based design principles from an English language perspective and research findings which can assist on-line researchers to develop more appropriate and better-designed Internet-based surveys for users of Thai web sites. The main sections of this chapter will be four parts: discussion, limitations, recommendations for future research regarding on-line surveys and, finally, conclusions.

8.1. Discussion

Based on the research questions that have guided this study, the principal issues in this discussion section are; the preferred format for web-based surveys, crucial implementation details for web-based survey design, the most effective way to persuade Thai university students to complete an on-line survey, and the factors influencing the decision to participate in web-based surveys. Whilst it is true that the survey results are biased towards responses from Thai Internet users, this does not in any way negate the value and relevance of the survey results. These results represent the views of regular visitors to Thai university web sites and visitors who have visited such web sites.

8.1.1. The preferred on-line questionnaire format

Referring to web usability testing conducted in stage two of this research, the preferred format for a web-based survey for Thai university students was a scrolling page, not a one item per page or multiple-screen version. The Thai Internet users in this study preferred a scrolling page format because of the less complex structure and reduced clicking and also the reduced time needed for downloading. This finding also supported the other research studies which have had similar results, for example, in Sweden at the University of Linkoping by Forsman and Vatedian (2002), and in America with 1,602 University of Michigan students by Couper et al. (2001).

From the designer's viewpoint, it is necessary to know the format of the web page at the beginning stage of the design process in order to make plans for collecting the survey data. This is an important consideration in the design because the appearance of the web-based survey initially influences users' decision to complete the survey.

8.1.2. Crucial implementations of web-based survey

This subsection is about the findings of this current qualitative research study that are crucial elements to be implemented in web-based survey design. One part of these current study findings are also in line with the majority of previous web-based survey design research results. The first finding was that a web-based survey might not only gather a higher response rate but also more accurate results whenever a site is endorsed by a trusted organization as this makes a task appear more important and relevant (Dillman, 2000; Lang, 2005).

The second was the writing style for the directions and wording of the questions and answer options which also use the same principles as traditional survey design, such as being short, simple, specific and understandable (Barnes, 2001; de Vaus, 2002; McNamara, 1999a; Taylor-Powell, 1998). Moreover, the writing style technique, for example, in providing enough possible options in the closed-ended questions could assist in reducing the time needed for completion.

Additionally, this current research also found that questionnaire scripts that are translated from English into Thai, especially dichotomous questions, were not appropriate. This concern is also an issue when conducting an international, multilingual survey (Lang, 2005). Remarkably, the options for dichotomous questions need to be written in their full form in order to reduce ambiguities that might occur in Thai.

The third finding concerned the appropriate font size for the content of Thai web-based surveys. This also matched previous research suggestions that recommended the “-1” font size of Ms Sans Serif or 14 pixels as appropriate for Thai script web sites (Kirkpatrick, 2003). Additionally, there was no need to add more white space in order to present only one question per screen since users indicated that they prefer the scrolling page format and like to view all questions continuously (see the appendices).

The fourth idea related to effective navigation of web-based surveys was that users prefer a progress bar to indicate how much of the task has been done. To satisfy participants, a progress bar indicating the percentage of work completed was better to be simple as wording or numbering rather than fancy graphics that keep flashing. This current web-based survey also did not include a progress bar due to redundancy for a short questionnaire form. Since previous research shows that there is no significant difference in the completion rate of surveys whether using or not using a progress bar in an on-line questionnaire for students at the University of Michigan (Couper et al., 2001), the Thai students in this study clearly indicated their preference for a progress bar.

The fifth finding concerns problems associated with types of survey questions. It was found that almost all types of questions used in a paper-based survey also could be used in a web-based version for Thai university students. However, there were some concerns on the rating scale questions, for instance, semantic differential questions and matrix questions which caused participants both time and effort to weigh up all the options and they made most users feel confused. Moreover, the labelling of options in semantic differential questions need to be written clearly and also it is recommended to use the 'Alt' to explain the value when a mouse is moved over that particular option (see Figure 6.1.).

Furthermore, five-point rating questions also cause users to be dissatisfied and confused regarding the degree of options. The problems of using the rating scale questions were two: labelling of items and the number of items, since interviewees indicated that it is difficult to judge the different levels of items and meaning. Therefore, to reduce problems with the five-point scale rating questions, as suggested by the participants, this current research contained only three-point scale questions as also indicated by Zucker & Eaton (2006). They suggested that in third world countries, the three-rating scale is appropriate for surveys. The finding of reducing the five-point rating scale into three-point scales was to open up a new format for attitude questionnaires for Thai university students, because usually the common format has been five-point scales. As the theory and practice for Thai surveys has been reproduced from English textbooks in conducting surveys generally, the questionnaire format will be unhesitatingly approved by Thai experts but generally without any

formal usability testings. Therefore, the three-point rating scale can be confidently used in future surveys because it has been derived from observations and interviews with different faculty students.

Another issue regarding questions in on-line surveys was the Internet technology's efficiency in assisting to reduce errors in responses in the rank order questions as the users prefer to choose a number from the menu pull down instead of inserting a number.

This current research also uncovered some findings contrary to some previous research studies. This might be because of the difference in cultures and languages between west and east and the different periods when the surveys were conducted. The first discovery was that Thai university students indicated that the demographic information section should be obtained before completing the questionnaire (see section 6.2.5.). A short and not too sensitive version of the demographic data request can be asked at the beginning of the survey to categorize participants to the specific group. The rationale conforms with Barnes' (2001) idea that requesting demographic information can be a filter technique to distinguish those individuals who can and cannot respond appropriately to questionnaires (Barnes, 2001). However, this differs from Dillman's (2000) principle that recommends placing the demographic section at the end of a survey due to the personal nature of some questions (Dillman, 2000; O'Rourke & O'Rourke, 2002).

The responses to questions asking for private and personal information from users of Thai university web sites also depend on their familiarity with and trust in the organization owning the survey. This is perhaps affected by the development of Internet technology usage that university students have become used to with utilising the email. Since the early recommendation by Dillman (2001) that users feel hesitant to give email addresses, attitudes have changed; as this current research which collected data in 2004 has shown, the Thai university students of today are more confident giving email addresses in the web-based survey. As the participants indicated, giving their email address to the university did not cause them to quit the survey however. Attrition might be increased when the students leave aside some difficult questions or are asked to give student ID number or mobile phone numbers since it seems too personal information.

This current research also found that the graphic features of the survey included use of colour and multimedia features to influence the motivation of respondents to complete the questionnaire. The university students preferred to have illustrations and graphics for decoration purposes and these needed to stand out from the university web site or main web page. This finding was relevant to implementing web-based surveys for Thai university students due to the need for survey form unity which affects the motivation of respondents. Additionally, a cartoon graphic was recommended by participants; therefore, what was popular with or interesting for the target population was important when decorating the survey form. However, the form including decoration does not mean it has to be in a fancy style. The fancy style as experimented by Dillman and his team (1998) refers to web-based survey forms utilising html tables, multiple colours, motion and advanced features such as animation and sound track (Dillman et al., 1998). Therefore, this research finding did not fully support previous research; rather it supported a middle position because Thai university students considered the plain style of the survey to be too simple and it decreased the attractiveness of volunteering to complete surveys. Moreover, this has resulted in new knowledge in that it reflected Thai culture as preferring a decorative format rather than the plain survey form.

The length of questionnaires focused on both the approximate number of items and the affordable time for completing the survey. During the observations, when using the 30 item questionnaires, the participants indicated that it was too long and the average number of items for a questionnaire as indicated by participants in the interviews as appropriate was 20 items. In addition, the average of acceptable duration of time for completing a web-based survey was about five to ten minutes. These findings are supported by previous research which revealed that surveys that contained less than 20 items gained a greater response rate (Deutskens et al., 2004). However, this is not congruent with Suskie (1996) who indicates that the appropriate length of a questionnaire, should be about 25 – 30 questions and that it take time less than 15 minutes for completion, depending on the population and topics in the survey (Suskie, 1996). Additionally, referring to the finding of this current research that was the numbers of survey completion on weekdays was higher than on weekends, also differed from the experimental research that recruited both undergraduates and non-student participants in the USA by O'Neil and Penrod (2001).

The Thai university students who participated in the interviews indicated having a good understanding of using basic icon format: a check box, an option button or a radio button and a drop-down menu. This finding also differed from a previous experimental study in the USA that the measurement errors might occur when the surveys include elements or icons such as radio buttons, check boxes and drop-down menu (O'Neil & Penrod, 2001).

Moreover, the Thai university students believed that Internet technology can enhance the quality of web-based surveys as they expect the survey to skip them to particular questions as appropriate and to specify what item(s) they have forgotten to respond to. Therefore, this set of results provides the confidence that future research will have fewer problems with any measurement error that might occur due to using web technology. As the target population was university students, at least they have already acquired the foundations of computer literacy and networks from the secondary school level. Therefore, the necessity of providing a help section for completing the on-line questionnaire is crucial only when the survey is more complex than a general survey.

8.1.3. The characteristics of participants

Based on the web-based survey conducted to evaluate the most effective invitation methods on the university's homepage, the characteristics of participants from this current survey did not differ meaningfully from the real population as reported in the university profile. The participants were mostly female (68 %), which nearly approximated the real population (63 %). Therefore, the results of the study provide a substantial but not perfect basis in guiding future research, even though random sampling techniques are impossible in Internet survey research.

8.1.4. The most effective invitation method

'A message box when users click on any links on the homepage' sums up the most effective invitation method from this three-week experimental research. The response rate with the message box was superior to both a pop-up window and advertising marquee whose response rates were 62 per cent (2,376 times), 36 per cent (1,389 times) and 2 per cent (83 times) respectively. The total completions for the survey were 22.7 per cent (3,848 times). The response result was not especially high when compared with the average response rate of the pop-up window invitation reported

elsewhere. But as MacElroy (2000) states, response rates are generally about 15-30 per cent. One possible reason that caused the low response rate could be the restriction on offering any incentive to participate in the survey and the usage of impersonal broadcast communication to a large anonymous group.

In comparing the three invitation methods' response rates, there were many possible rationales for 'the message box' gaining the highest response rate; the new technology, no restriction from the browser and its gaining the attention of users. Presently, there is no research report on 'the message box' invitation method as it has not been regularly used. Thus users might have been curious to following up the window rather than the other two methods. Moreover, the big barrier to 'a pop-up window', even if including a cartoon graphic, was the privacy block option in the browser. Additionally, the effectiveness of a message box perhaps may come from the reading patterns on the Internet as one report found that 78 per cent of users look at text, and 22 per cent look at graphics (Nielsen, 2000a). Another point in support of the effectiveness of a message box was the weekly average completion rate that was slightly reduced from the first week but remained almost stable two weeks later

8.1.5. The factors influencing the decision to respond

This current survey was designed to exclude one variable, namely offering incentives to users of Thai university web sites. The finding that participants indicated as the most significant reason influencing their decision on questionnaire participation was also the same as factors effecting the decision to participate in future surveys, that is, the *topic of the survey* followed by *the importance of the survey content*. The third reason influencing users' decision to participate in this survey was the invitation methods. The third factor affecting users' decision in the future became 'the benefit for respondents'. This result conformed to the fundamental factors impacting on traditional survey response as questionnaire topics (Dillman, 2000).

8.2. Limitations

The Internet technology under investigation in this experiment has shown itself to be one, subject to rapid change and development of survey design for Thai university web sites. As a result, the spotlight has been focused on many aspects of Internet technology impacting upon the delivery of web-based surveys conducted under limiting conditions such as restricting of email invitation, password protection and the

offering of incentives. Additionally, the study has not attempted to gauge the impact of web-based survey design principles on other kinds of web sites except education, for example. As the research focuses on comparing response rates of three different invitation methods, it is impractical to randomly select Internet users using a pop-up window or a message box to be equal with an advertising marquee. Section 8.4 will highlight a number of directions to take that will help a diverse and globally scattered web-based survey researcher community to achieve positive coherent outcomes.

8.3. Recommendations

This research has identified a number of factors that were considered to be crucial to the future sustainable growth of web-based survey design to address the increasing use of questionnaires on the Internet for the Thai academic on-line community. But these recommendations could have application for many other types of web sites as well as those in cognate languages such as Lao.

Experience in the use of Internet technology for survey delivery in the Thai context, even with extensive western background knowledge, is still at a fledgling stage. The results illustrate that there is much scope for research into how to develop and apply new principles and methods to full advantage in the future. The traditional ad hoc usability testing approach for web-based research focused on appropriate design elements needs to be retained.

Research on survey design for Thai web sites needs to be conducted with the focus on many variables. For instance, comparisons of various passive invitation methods in terms of response rates, differential presentations in randomized techniques, attitudes toward invitation, incentives toward invitation and comparing annual web-based survey response rates. Additionally, the study of different presentations of ‘a message box’ perhaps will determine the most effective invitation method for other kinds of web sites by comparing text mode, text including images and image modes, for example. Moreover, a web-based survey for Thai university web sites should research the most popular survey topics. Also research of web-based surveys should be undertaken on a variety of survey topics and other types of web sites.

One factor that might affect Thai university students’ decision to participate in both the paper-based survey and the web-based survey is the “language” used in the

questionnaire. In theory, Thai university students are able to understand English and some other languages such as German or French. However, the most confident language for Thai people is their own language and their situation might be similar to other countries that have one official language. A self-administered survey on the Internet where participants are concerned about time should be administered in the language in which most people are fluent. Even though there are big groups of Thai university students with fluency in English such as students from the sciences or engineering faculties, the Thai language is still the most understandable for all. Hence, this might be an issue that needs to be explored in the future.

Furthermore, the issue of types of questions suitable for on-line questionnaires should be examined in other population groups such as secondary students or students in other countries. This might help using the survey as an instrument for more effective response rates.

8.4. Conclusions

The growth of on-line questionnaires has been increasing dramatically in the English context while there has been only limited research on web-based design in the Thai context. Hence, this study has extended the knowledge base of research into web-based survey design principles in the Thai context. Web-based survey research has gained more significance as the Internet has become a major tool of rapid communication. These current research results provide an analysis that indicates an effective means of encouraging Thai university students, who are the biggest group of Thai Internet users to respond and complete Internet-based surveys.

The methodologies of this research were designed to explore appropriate web-based survey design for users of Thai university web sites. Three stages of research were: development of the content for a web-based survey, identification of web-based survey design principles and evaluation of the most effective invitation method. The research findings of web-based survey design could assist on-line researchers to develop more appropriate and effective Internet-based surveys. These findings are as follows:

- The scrolling web-based survey was the preferred format for Thai university students, not the one item per page or multiple-screen version. This was

because participants were concerned about time of downloading and simpler structure,

- Endorsement by a trusted organization would seem to result in higher response rate and more accurate results,
- The effective writing style for a web-based survey is based on two writing principles: the principles of writing for the traditional survey and, secondly, web information that is short, simple, specific and understandable,
- Providing limited answer options to the closed-ended questions could reduce time of completion,
- To reduce ambiguities that might occur in Thai when a questionnaire is translated from other languages, the options of dichotomous questions need to be fully written,
- The “-1” font size of Ms Sans Serif or 14 pixels in Thai was appropriate for the content of both English and Thai web-based surveys,
- Thai university students are satisfied to have a progressing bar to indicate how much of the task has been done,
- The types of question that present no problem for web-based questionnaires for Thai university students were dichotomous questions, filter questions, multiple option questions, open-ended questions, ordinal questions and single option questions. Three types of questions presenting difficulty were the five-point scale rating question which should be reduced to three-point scales, together with matrix and semantic differential questions which users found difficult to answer,
- The demographic information section should be placed at the start before completing the questionnaire. It should contain only short and not too sensitive questions,
- Asking private and personal information questions to users of Thai university web sites also depend on familiarity with and trust in organizations and their own survey. Requiring email addresses is not a cause for users to quit a survey; however, attrition will be increased when surveys require answering

difficult questions or requiring student ID number or mobile phone number since it seems information that is too personal,

- Thai university students preferred the decorated web-based survey rather than the plain web page. The unity of the Internet questionnaire was important to inform and encourage participation response to the survey,
- The suggested number of questions for an Internet survey are about twenty items which would take around five to ten minutes to complete,
- There was no problem with the following response icons for a web-based survey: a check box, an option button or a radio button and a drop-down menu,
- The Thai university students preferred Internet technology in terms of possibly enhancing the quality of web-based surveys for example, skipping to appropriate questions and reminding of forgotten items,
- The necessity of providing a help section for completing the on-line questionnaire was crucial only when the survey was more complex than a general survey.

The majority of participants were female and the biggest group of participants were university students - these characteristics were similar to the real population. Additionally, the survey completion rate was comparatively good (22.7 % or 3,848 times), especially university students (1,261 times) and prospective students (1,097 times). Therefore, the results extrapolated from the survey and the conclusions drawn may be an indication of the specific situation in regard to the targeted groups.

The finding of the most effective invitation method excluding email addresses has become more significant due to the high competition for information on the web page. Therefore, this research result confirms the relevance of active invitation methods to persuade Internet users in terms of better response rates rather than passive invitation methods. The most effective invitation method from this experimental research on Thai university web sites was 'a message box when users click on any links on the homepage'. 'A message box' gathered the highest response rate because it is a new method with no restriction from the browser and effectiveness in grasping the attention of users. Moreover, 'a message box' appeared quickly when users click on

any links due to its text version. The benefit from text version only conformed to the reading patterns of Internet users that focus on text rather than images. Again, a new method of a message box might affect the weekly average response rate that was slightly reduced after the first week but remained almost stable two weeks later.

The most significant reasons influencing users of Thai university web site decisions about filling in a questionnaire were the same factors effecting the decision to participate in another survey in future, namely, *the topics of the survey* followed by *the importance of the survey content*. The third reason influencing users' decision to participate in this survey was *the invitation methods*. Regarding the future, the third factor affecting users' decision became 'the benefit for respondents' and the fourth factor was the invitation method.

The study of design for the Internet-based survey is not only important to future research using the on-line questionnaire as a tool but also reflects the relevance of the recent human on-line communication pattern. As the Internet is increasing in use for connecting people around the world, research on the design of web pages for specific purposes is playing a role as a compass to successful utilization of this new tool in human communication. The research study on human-Internet interaction should focus on how people from different cultural and linguistic backgrounds respond to the same design, not merely adopt it as has happened in many countries previously.

LIST OF REFERENCES

- Aldridge, A., & Leving, K. (2001). *Surveying the Social World*. Buckingham: Open University Press.
- Alexander, D. (2003, 17th April). *Introduction to usability and user-centred design*. Retrieved 21st Jan, 2005, from <http://deyalexander.com/presentations/usability-ucd/>
- Alexander, D. (2004). *Web accessibility : standards and goals for university web sites*. Retrieved 21st Jan, 2005, from <http://www.swin.edu.au/hosting/webmaster/webaccessibility.html>
- Alibocus, K. (2001). *Online Market Research: An Analytic Overview*. Retrieved 27 May, 2003, from <http://www.mednetmedia.com/pdfs/onlinemarketr.pdf>
- Alvarez, M., Sherman, R., & VanBeselaere, C. (2002, January 24). *Subject Acquisition for Web-Based Surveys*, from <http://survey.caltech.edu/alvarez.pdf>
- Alvarez, M., & VanBeselaere, C. (2003). *Web-Based Surveys*. Retrieved 26 May, 2003, from <http://survey.caltech.edu/encyclopedia.pdf>
- Andrews, D., Nonnecke, B., & Preece, J. (2001, October 10-14). *Web-based Surveys: Exploring Design and Implementation Issues*. Paper presented at the the Association of Internet Researchers, 2nd International Conference, University of Minnesota.
- Andrews, D., Nonnecke, B., & Preece, J. (2003). Electronic survey methodology: A case study in reaching hard to involve Internet Users: Conducting Research on the Internet: Online Survey Design, Development and Implementation Guidelines [electronic version]. *International Journal of Human-Computer Interaction*, 16(2), 185-210.
- Arsham, H. (2004). *Questionnaire Design and Surveys Sampling*. Retrieved 14th April, 2004, from <http://www.sysurvey.com/tips/arsham.htm>
- Bachmann, D., Elfrink, J., & Vazzana, G. (2000). E-mail and snail mail face off in rematch. *Marketing Research*, 11(4), 10-16.
- Bailey, B. (1999). *Paging vs. Scrolling*. Retrieved 17th Dec, 2004, from <http://www.humanfactors.com/downloads/apr99.asp>
- Baker, A. (2001). *Effective use of forms on websites*. Retrieved 7th Feb, 2005, from <http://www.merges.net/theory/20010301.html>
- Barnes, S. (2001). *Questionnaire Design and Construction*. Retrieved 6th Feb, 2004, from http://www.cros.ac.uk/question_design.pdf
- Bathey, K. (2005). *Survey Questions and Answer Types*. Retrieved 16th Feb, 2005, from <http://www.questionpro.com/akira/showArticle.do?articleID=survey-questions>
- Bauman, S., Jobity, N., Airey, J., & Atak, H. (2000). *Invites, Intros and Incentives: Lessons from a Web Survey*. Retrieved 19th March, 2004, from <http://www.wirthlin.webaxxs.com/wintellitech/aapor5.PDF>
- Belbey, J., & Gedney, K. (2003, 29 January, 2003). *Online Surveys, Part 1: Instant Marketing Intelligence*. Retrieved 15 April, 2003, from http://www.clickz.com/em_mkt/b2b_em_mkt/article.php/1575681
- Bell, M., Bush, D., Nicholson, P., O'Brien, D., & Tran, T. (2002). *Universities Online A survey of online education and services in Australia [Electronic Version]* (Vol. March 2002). Canberra: Higher Education Group.

- Bennekom, F. (2002). Feature: art and science of customer surveys [Electronic version]. In *Customer Surveying: A Guidebook for Service Managers* (Vol. issue 9): Customer Service Press.
- Biffignandi, S., Pratesi, M., L. Manfreda, K., & Vehovar, V. (2002, 25-28 August). *List assisted Web Surveys: quality, timeliness and non-response in the steps of the participation flow*. Paper presented at the ICIS 2002 The International Conference on Improving Surveys, University of Copenhagen - Denmark.
- BOOZ-ALLEN & HAMILTON. (2000, 30 June 2000). *E-Commerce at the Grass Roots Implications of a Wired" Citizenry in Developing Nations*. Retrieved 3rd November, 2005, from http://www.odci.gov/nic/PDF_GIF_research/grass_roots.pdf
- Bosnjak, M., & Tuten, T. (2001). Classifying Response Behaviors in Web-based Surveys [electronic version]. *Journal of Computer-Mediated Communication*, 6(3).
- Brown, T., Kaul, A., Holter, P., & Hill, D. (2004). *Market Research Tools: Market Surveys*. Retrieved 11th May, 2004, from <http://www.powerdecisions.com/market-surveys.cfm>
- Burkey, J., & Kuechler, W. (2003). Web-based surveys for corporate information gathering: A bias-reducing design framework [Electronic version]. *Professional Communication, IEEE Transactions*, 46(2), 81 -93.
- Cahill, D., Bouma, G., Dellal, H., & Leahy, M. (2004). *Religion Cultural Diversity and Safeguarding Australia*. Canberra: DIMIA.
- Cambridge University Press. (2004a). *Census Meaning*. Retrieved 11th May, 2004, from <http://dictionary.cambridge.org/results.asp?searchword=census>
- Cambridge University Press. (2004b). *Poll Meaning*. Retrieved 21th May, 2004, from <http://dictionary.cambridge.org/results.asp?searchword=poll>
- Cambridge University Press. (2004c). *Survey Meaning*. Retrieved 11th May, 2004, from <http://dictionary.cambridge.org/results.asp?searchword=survey>
- Carbonaro, M., Bainbridge, J., & Wolodko, B. (2002). Using Internet surveys to gather research data from teachers: Trials and tribulations [electronic version]. *Australian Journal of Educational Technology*, 18(3), 275-292.
- Carini, R., Hayek, J., Kuh, G., & Ouimet, J. (2003). College student responses to web and paper surveys: Does mode matter? [electronic version]. *Research in Higher Education*, 44(1), 1-19.
- Chisholm, W., Vanderheiden, G., & Jacobs, I. (1999, 5th May 1999). *Web Content Accessibility Guidelines 1.0*. Retrieved 19th August, 2003, from <http://www.w3.org/TR/WAI-WEBCONTENT/>
- Choo, C. W. (1997). IT2000: Singapore's Vision of an Intelligent Island [Electronic version]. In P. Droege (Ed.), *Intelligent Environments*: North-Holland.
- Christian, L. M., & Dillman, D. (2003). *The Influence of Symbolic and Graphical Language Manipulations on Answers to Self-Administered Questionnaires: Results from 14 Experimental Comparisons*. Retrieved 20 April, 2004, from <http://survey.sesrc.wsu.edu/dillman/papers/final.pdf>
- Cobanoglu, C., & Cobanoglu, N. (2003). The effect of incentives in web surveys: application and ethical considerations. *International Journal of Market Research*, 45(4), 475.
- Comley, P. (2000, 10-12 April). *Pop-up Surveys - What works, what doesn't work and what will work in the future*, 237, from http://www.virtualsurveys.com/papers/paper_4.asp

- Comley, P. (2003). *Online Surveys and Internet Research*. Retrieved 9 April, 2003, from http://www.virtualsurveys.com/docs/paper_1.doc
- ComputerScope. (2004a). *How Many Online in Asia?* Retrieved 20 Jan, 2004, from http://www.nua.com/surveys/how_many_online/asia.html
- ComputerScope. (2004b). *How Many Online in Europe?* Retrieved 20 Jan, 2004, from http://www.nua.com/surveys/how_many_online/europe.html
- ComputerScope. (2004c). *How Many Online in US & Canada?* Retrieved 20 Jan, 2004, from http://www.nua.com/surveys/how_many_online/us_canada.html
- ComputerScope. (2004d). *How Many Online?* Retrieved 20 Jan, 2004, from http://www.nua.com/surveys/how_many_online/index.html
- ComputerScope. (2004e). *Nua Internet How Many Online- Methodology*. Retrieved 17 Jan 2004, 2004, from http://www.nua.ie/surveys/how_many_online/methodology.html
- Couper, M. (2000). Web Survey Design: A Review of Issues and Approaches. *Public Opinion Quarterly*, 64(4), 464-494.
- Couper, M., Blair, J., & Triplett, T. (1999). A Comparison of Mail and E-mail for a Survey of Employees in U.S. Statistical Agencies [electronic version]. *Journal of Official Statistics*, 15(1), 39-56.
- Couper, M., Traugott, M. W., & Lamias, M. J. (2001). Web Survey Design and Administration [electronic version]. *Public Opinion Quarterly*, 65(2), 230-253.
- Cousin, C., & Vinckenbosch, M. C. (2000, October). *Speed Reading Test Online*. Retrieved 26th June, 2003, from <http://www.readingsoft.com/>
- Crawford, S., McCabe, S., Couper, M., & Boyd, C. (2002, 25-28 August). *From Mail to Web: Improving Response Rates and Data Collection Efficiencies*. Paper presented at the ICIS 2002 The International Conference on Improving Surveys, University of Copenhagen - Denmark.
- Dalton, P. (2004). *How to Evaluate EIS: Stage 4a, Questionnaires*. Retrieved 3rd September, 2004, from <http://www.evalued.uce.ac.uk/tutorial/4a.htm>
- Davis, D., Davis, G., Davis, C., & Davis, G. I. (2005, 21st April). *Survey Probability Calculator*. Retrieved 21st April, 2005, from <http://www.csgnetwork.com/surveysizereqcalc.html>
- de Vaus. (2002). *Surveys In Social Research* (5 ed.). NSW Australia: Allen & Unwin.
- Denscombe, M. (2003). *The Good Research Guide for Small-scale Social Research Projects* (2 ed.). Great Britain: Open University Press McGraw-Hill Education.
- Department of Statistics Malaysia. (2003, May 2003). *Malaysian External Trade Statistics May 2003*. Retrieved 25th Aug, 2003, from <http://www.statistics.gov.my/English/RPMMei03a.htm>
- Deutskens, E., Ruyter, K., Wetzels, M., & Oosterveld, P. (2004). Response Rate and Response Quality of Internet-based Surveys: An Experimental Study [Electronic version]. *Marketing Letters. Boston*, 15(1), 21.
- Deutskens, E., Ruyter, K. d., Wetzels, M., & Oosterveld, P. (Feb 2004). Response Rate and Response Quality of Internet-based Surveys: An Experimental Study [Electronic version]. *Marketing Letters. Boston*, 15(1), 21.
- Diane, G. B. (1999). *Evaluating the Internet as a research tool: A comparison of telephone and World Wide Web national park surveys*. Unpublished PhD, Colorado State University.

- Dillman, D. (1999). *Mail and Other Self-Administered Surveys in the 21st Century: The Beginning of a New Era**. Retrieved 4th June, 2004, from <http://survey.sesrc.wsu.edu/dillman/papers/svys21st.pdf>
- Dillman, D. (2000). *Mail and Internet surveys* (2 ed.). New York: John Wiley & Sons, Inc.
- Dillman, D. (2002). *Navigating the Rapids of Change: Some Observations on Survey Methodology in the Early 21st Century*. Retrieved 20 April, 2004, from <http://survey.sesrc.wsu.edu/dillman/papers/AAPOR%20Presidential%20Addresses.pdf>
- Dillman, D., Smyth, J. D., Christian, L. M., & Stern, M. J. (2003, 14 Aug). *Multiple Answer Questions in Self-Administered Surveys: The Use of Check-All-That-Apply and Forced-Choice Question Formats*, from http://survey.sesrc.wsu.edu/dillman/papers/Check%20all%20Draft%20_final%20revision.pdf
- Dillman, D., Tortora, R., Conradt, J., & Bowker, D. (1998). *Influence of Plain VS. Fancy Design on Response Rates for Web Surveys*. Retrieved 22 March, 2003, from www.survey.sesrc.wsu.edu/dillman/papers/asa98ppr.pdf
- Dommeyer, C., & Moriarty, E. (2000). Comparing two forms of an e-mail survey: Embedded vs. attached. *Market Research Society. Journal of the Market Research Society; ABI/INFORM Global*, 42(1), 39-50.
- Doyle, J. K. (2004). *Introduction to Survey Methodology and Design*. Retrieved 11th May, 2004, from http://www.sysurvey.com/tips/introduction_to_survey.htm
- Eaden, J., Mayberry, M. K., & Mayberry, J. F. (1999). Questionnaires: the use and abuse of social survey methods in medical research [electronic version]. *The Fellowship of Postgraduate Medicine*(75), 397-400.
- Eaton, B. (1997). *Internet surveys: Does WWW stand for 'Why waste the work?'*. Retrieved 24th March, 2004, from http://www.quirks.com/articles/article.asp?arg_ArticleId=244
- Eiler, M., & Fetterman, D. (2000, November). *Empowerment and Web based evaluation*. Retrieved 24th March, 2004, from <http://www.stanford.edu/~davidf/empowerweb.pdf>
- Ericksen, E. (2001). *Why Sampling is not Polling*. Retrieved 11th May, 2004, from <http://govinfo.library.unt.edu/cmb/cmbp/downloads/polling.pdf>
- Foong-Mae, C. (2002, 15 - 22 October 2002). *ICT in Malaysian Schools: Policy and Strategies*. Paper presented at the Seminar / Workshop on the Promotion of ICT Education to Narrow the Digital Divide, Tokyo, Japan.
- Forsman, G., & Varedian, M. (2002, 25-28 August). *Mail and Web Surveys: A Cost and Response Rate Comparison in a Study of Students Housing Conditions*. Paper presented at the ICIS 2002 The International Conference on Improving Surveys, University of Copenhagen - Denmark.
- Fraze, S., Hardin, K., Brashears, T., Haygood, J., & Smith, J. H. (2002). *The Effects of Delivery Mode Upon Survey Response Rate and Perceived Attitudes of Texas Agri-science Teachers*. Retrieved 30 May, 2003, from <http://aaaeonline.ifas.ufl.edu/NAERC/2002/naercfiles/NAERC/Effects%20Delivery%20Fraze-Hardin-Brashears-Haygood-Smith.pdf>
- Fraze, S., Hardin, K., Brashears, T., Haygood, J., & Smith, J. H. (2003). The Effects of Delivery Mode Upon Survey Response Rate and Perceived Attitudes of Texas Agri-science Teachers [electronic version]. *Journal of Agricultural Education*, 44(2), 27-37.

- Frey, J. H., & Oishi, S. M. (1995). *How to Conduct Interviews by Telephone and in Person*. U.S.A.: SAGE Publications, Inc.
- Galesic, M. (2005). *Effects of questionnaire length on response rates: Review of findings and guidelines for future research [electronic version]*. Retrieved 6th Feb, 2005, from http://mrav.ffzg.hr/mirta/Galesic_handout_GOR2002.pdf
- Glenwright, J. (2003). *www layout* (Revised ed.). London: Cassell & Co United Kingdom.
- Global Reach. (2002, 30 Sept., 2002). *Global Internet Statistics: Sources & References*. Retrieved 19 May, 2003, from <http://global-reach.biz/globstats/refs.php3>
- Gomoll, K. (1992). Some Techniques for Observing Users. In L. Brenda (Ed.), *The Art of Human-Computer Interface Design* (pp. 85-90). New York: Addison-Wesley Publishing Company, Inc.
- Goto, K. (2000). *Usability Testing Assess Your Site's Navigation & Structure*. Retrieved 11th Jan, 2005, from www.gotomedia.com/downloads/goto_usability.pdf
- Grandcolas, U., Rettie, R., & Marusenko, K. (2003). Web Survey Bias: Sample of Mode Effect? [Electronic version]. *Journal of Marketing Management*, 19.
- Griffis, S. E., J.Goldsby, T., & Cooper, M. (2003). Web-based and Mail Surveys: A Comparison of Response, Data and Cost. *Journal of Business Logistics*, 24(2), 237-259.
- Gunn, H. (2002, December). *Web-based Surveys: Changing the Survey Process*. Retrieved 25 May, 2003, from http://firstmonday.org/issues/issue7_12/gunn/index.html
- Haraldsen, G., Dale, T., Dalheim, E., & Stromme, H. (2002, 25-28 August). *Mode Effects in a Mail plus Internet Designed Census*. Paper presented at the ICIS 2002 The International Conference on Improving Surveys, University of Copenhagen - Denmark.
- Hedge, A. (2005). *Ergonomix Guidelines for User-Interface Design*. Retrieved 16th Jan, 2005, from <http://ergo.human.cornell.edu/ahtutorials/interface.html>
- Heerwegh, D., & Loosveldt, G. (2002, 25-28 August). *An evaluation of the effect of response formats on data quality in Web surveys*. Paper presented at the ICIS 2002 The International Conference on Improving Surveys, University of Copenhagen - Denmark.
- Helgeson, J., Voss, K., & Terpening, W. (2002). Determinants of Mail-Survey Response: Survey Design Factors and Respondent Factors. *Psychology & Marketing*, 19(3), 303-328.
- Henry, S. (2004, 23rd April 2004). *Policies Relating to Web Accessibility*. Retrieved 27th June, 2004, from <http://www.w3.org/WAI/Policy/>
- Hollenbeck, A. R. (2003). *Internet-Based Survey Research: Small- and Large-Scale Research for Business Decisions*. Retrieved 24 June, 2003, from <http://galeb.etf.bg.ac.yu/~vm/cd1/papers/2.pdf>
- IBM. (2005). *What is user experience design?* Retrieved 17th Jan, 2005, from http://www-3.ibm.com/ibm/easy/eou_ext.nsf/publish/10
- ICT Thailand. (2004). *Policy and Strategy*. Retrieved 7th Feb, 2004, from [http://www.oic.thaigov.go.th/ginfo/asp/b_moreinfo.asp?id=G\\$0119002&kw=](http://www.oic.thaigov.go.th/ginfo/asp/b_moreinfo.asp?id=G$0119002&kw=)
- Jensen, J. M. (2006). *Ten Easy Ways to Increase Response Rates For Your Online Survey*. Retrieved 20 Dec, 2006, from <http://www.questionpro.com/akira/showArticle.do?articleID=deploy01>

- Joinson, A. N. (2003a). *Knowing me, Knowing You: Reciprocal self-disclosure in Internet-based surveys*. Retrieved 14 April, 2003, from <http://iet.open.ac.uk/pp/a.n.joinson/papers/Reciprocal%20self.PDF>
- Joinson, A. N. (2003b). *Social Desirability, Anonymity and Internet-based questionnaires*. Retrieved 16 May, 2003, from <http://iet.open.ac.uk/pp/a.n.joinson/papers/socialdesirability.PDF>
- Joinson, A. N. (2003c). *Understanding the psychology of Internet behaviour: virtual worlds, real lives*. Great Britain: Palgrave Macmillan.
- Keereerat, C. (2000). *A comparison of response rates and sincerity in questionnaire responses on the internet with different sending approaches, follow up techniques and contents*. Unpublished Master of Education, Chulalongkorn University, Bangkok, Thailand.
- Kirkpatrick, C. H. (2003). Get two for the price of one: Accessibility and Usability [electronic version]. *Computer in Libraries*, 23(1), 26-29.
- Koanantakool, T. (2001, 2001). *Internet in Thailand The perpetual chronicles of Internet events in Thailand*. Retrieved 2 April, 2003, from <http://www.nectec.or.th/users/htk/milestones.html>
- Kogovsek, T. (2006). Reliability and Validity of Measuring Social Support Networks by Web and Telephone (electronic version). *Advances in Methodology and Statistics*, 3(2), 239-252.
- Krosnick, J. A. (1999). Survey research. *Annual Review of Psychology*. Palo Alto., 50, 537-567.
- Krosnick, J. A., & Alwin. (1987). An Evaluation of a Cognitive Theory of Response-Order Effects in Survey Measurement. *Public Opinion Quarterly*, 51, 201-219.
- Krug, S. (2000). *Don't Make Me Think*. Indiana USA: New Riders Publishing.
- Lang, M. (2005). *The Use of Web-based International Surveys in Information Systems Research*. Retrieved 31st March, 2005, from http://www.is.nuigalway.ie/mlang/research/ECRM_2002.pdf
- Lewis, A. (2002). *Australia: Winning in the Global ICT Industry - Executive Summary*. Retrieved 8th August, 2003, from http://www.dcita.gov.au/download/0.6183,4_114021,00.pdf
- LinChiat, C. (2001). *A comparison of samples and response quality obtained from RDD telephone survey methodology and Internet survey methodology*. Unpublished PhD, The Ohio State University, Ohio.
- Linderman, M., & Fried, J. (2004). Defensive design for the Web : how to improve error messages, help, forms, and other crisis points: Chapter Four Bulletproof Forms [electronic version]. In. Indianapolis: New Riders.
- Lovelock, C. (2003, 12 May). *What Do We Need to Know Do We Need to Know and How Do We Find Out? and How Do We Find Out? Conducting Marketing Research Conducting Marketing Research*. Paper presented at the Partnership for Nonprofit Ventures 2nd Annual Conference, New York.
- MacElroy, B. (1999, July). *Comparing seven forms of on-line surveying [electronic version]*. Retrieved 3rd November, 2005, from http://www.quirks.com/articles/article.asp?arg_ArticleId=510
- MacElroy, B. (2000, April). *Measuring response rates in online surveys [electronic version]*. Retrieved 3rd, 2004, from http://www.quirks.com/articles/article_print.asp?arg_articleid=583
- MacElroy, B., Mikucki, J., & McDowell, P. (2002). *A Comparison of Quality in Open-end Responses and Response Rates Between Web-based and Paper and Pencil Survey Modes*. Retrieved 30 May, 2003, from

- http://www.ijor.org/ijor_archives/articles/quality_and_responserates_across_modes2.pdf
- Manfreda, K. L., Batagelj, Z., & Vehovar, V. (2002). Design of Web Surveys Questionnaires: Three Basic Experiments. *Journal of Computer Mediated Communication*, 7(3).
- Manfreda, K. L., & Vehovar, V. (2002a). *Do Web surveys really gain lower response rates than other survey modes? A meta-analysis*. Retrieved 30 May, 2003, from <http://www.websm.org/nase/Mannh2002.pdf>
- Manfreda, K. L., & Vehovar, V. (2002b, 25-28 August). *Survey Design Features Influencing Response Rates in Web Surveys*. Paper presented at the ICIS 2002 The International Conference on Improving Surveys, University of Copenhagen - Denmark.
- Marshall, S. (2001). *Consistency*. Retrieved 21st Jan, 2005, from <http://www.leafdigital.com/class/lessons/writing/8.html>
- McKeown, P. (2003, 24th Nov). *Questionnaire Design*. Retrieved 24th Feb, 2005, from <http://www.epiet.org/course/Presentations/2003/09-Questionnaire%20Design/09-Questionnaire%20Design.ppt>
- McMahon, S. R., Iwamoto, M., Massoudi, M. S., Yusuf, H. R., Stevenson, J. M., David, F., et al. (2003). Comparison of E-mail, Fax, and Postal Surveys of Pediatricians. *Pediatrics*, 111, e299 - 303.
- McNamara, C. (1999a). *Basics of Developing Questionnaires*. Retrieved 16th Feb, 2005, from <http://www.mapnp.org/library/evaluatn/questnrs.htm>
- McNamara, C. (1999b). *Purposes and Formats of Questions*. Retrieved 16th Feb, 2005, from http://www.mapnp.org/library/evaluatn/dsn_ques.htm
- Mentor, K. W. (2002, November 2002). *Internet-Based Survey Research*. Retrieved 12th March, 2004, from http://cjestudents.com/web_surveys.htm
- Nadler, R. (2003). *Web Surveys - For Knowledge, Lead Management, And Increased Traffic*. Retrieved 25 May, 2003, from http://www.perseusdevelopment.com/surveytips/thw_websurveys.html
- NECTEC, & NSTDA. (2000). *Internet User Profile of Thailand 1999*. Bangkok, Thailand: National Electronics and Computer Technology Center, National Science and Technology Development Agency.
- NECTEC, & NSTDA. (2001). *Internet User Profile of Thailand 2000*. Bangkok, Thailand: National Electronics and Computer Technology Center, National Science and Technology Development Agency.
- NECTEC, & NSTDA. (2002). *Internet User Profile of Thailand 2001*. Retrieved 9 May, 2003, from <http://www.nitc.go.th/internetuser/survey2001.html>
- NECTEC, & NSTDA. (2003a). *Internet User Profile of Thailand 2002*. Bangkok, Thailand: National Electronics and Computer Technology Center, National Science and Technology Development Agency.
- NECTEC, & NSTDA. (2003b, 13 March). *Internet users in Thailand*. Retrieved 20 Jan, 2004, from <http://www.ntl.nectec.or.th/internet/user-growth.html>
- NECTEC, & NSTDA. (2003c). *Statistics of The Internet in Thailand*. Retrieved 15 April, 2003, from <http://www.nitc.go.th/internetuser/internet1.html>
- Nicolini, G., & Presti, A. L. (2002, 25-28 August). *Composite Estimators for Complex Sampling*. Paper presented at the ICIS 2002 The International Conference on Improving Surveys, University of Copenhagen - Denmark.
- Nielsen, J. (1997). *How Users Read on the Web*. Retrieved 30 May, 2003, from <http://www.useit.com/alertbox/9710a.html>

- Nielsen, J. (2000a). *Eyetracking study of Web Readers*. Retrieved 30 May, 2003, from <http://www.useit.com/alertbox/20000514.html>
- Nielsen, J. (2000b). *Reset and Cancel Buttons*. Retrieved 30 May, 2003, from <http://www.useit.com/alertbox/20000416.html>
- Norman, K. L. (2003). *Guidelines: Web-based Questionnaires*. Retrieved 9 April, 2003, from http://lap.umd.edu/survey_design/questionnaires.html
- Norman, K. L. (2005a). *Definitions*. Retrieved 14th Jan, 2005, from http://lap.umd.edu/survey_design/defs.html
- Norman, K. L. (2005b). *Navigation*. Retrieved 14th Jan, 2005, from http://lap.umd.edu/survey_design/navigation.html
- Norman, K. L. (2005c). *Online Survey Design Guide*. Retrieved 14th Jan, 2005, from http://lap.umd.edu/survey_design/
- Norman, K. L. (2005d). *Usability / Accessibility*. Retrieved 14th Jan, 2005, from http://lap.umd.edu/survey_design/usaaaccess.html
- Norman, K. L. (2005e). *Web-based questionnaires*. Retrieved 14th Jan, 2005, from http://lap.umd.edu/survey_design/questionnaires.html
- Nua Internet Surveys. (2003). *How Many Online in Asia?* Retrieved 18 April, 2003, from http://www.nua.ie/surveys/how_many_online/asia.html
- O'Neil, K. M., & Penrod, S. D. (2001). Methodological variables in Web-based research that may affect results: Sample type, monetary incentives, and personal information [electronic version]. *Behavior Research Methods, Instruments, & Computers*, 33(2), 226-233.
- O'Connor, J. (2004, 30th Sept). *Top 5 Must-Haves on Every Web Page*. Retrieved 18th Feb, 2005, from <http://developers.evrsoft.com/article/web-design/web-design-tutorials/top-5-must-haves-on-every-web-page.shtml>
- O'Neill, H., Mitofsky, W., & Humphrey, T. (2006). *Statement about Internet Polls*. Retrieved 24th August, 2006, from <http://www.ncpp.org/internet.htm>
- O'Rourke, T., & O'Rourke, D. (2002, 22nd Sept.). *The ordering and wording of questionnaire items: Part II - technique for creating a well-designed questionnaire [electronic version]*. Retrieved 3rd November, 2005, from http://www.findarticles.com/p/articles/mi_m0CTG/is_4_17/ai_94198456
- Pandi, A. R. (2002, 25-28 August). *Web-Based Survey versus Conventional Survey: The Malaysian Experience in Conducting the Internet Subscriber Study*. Paper presented at the ICIS 2002 The International Conference on Improving Surveys, University of Copenhagen - Denmark.
- Pappajohn, J. (2005). *Questionnaire Development*. Retrieved 22nd April, 2005, from <http://www.jpec.org/handouts/jpec39.pdf>
- pearsonncs.com. (1996, October, 1996). *Data Collection Methods*. Retrieved 3rd September, 2004, from <http://www.pearsonncs.com/research-notes/96-10.htm>
- Perrin, N., & Rueter, J. (1998). *Web site design: Typography*. Retrieved 1st March, 2005, from <http://edtech.clas.pdx.edu/fipse/howto/design/pages/font.html>
- Pollack, A. (1996). *Happy in the East (^_^) of Smiling :-)* in the West. Retrieved 22 May, 2003, from <http://www.nytimes.com/library/cyber/week/0812smile.html>
- Redline, C., & Dillman, D. (2002). *The Influence of Alternative Visual Designs on Respondents' Performance with Branching Instructions in Self-Administered Questionnaires*. Retrieved 29th Jan, 2005, from <http://www.census.gov/srd/papers/pdf/sm00-04.pdf>
- Redline, C., Dillman, D., Dajani, A., & Scaggs, M. A. (2002). *The Effects of Altering the Design of Branching Instructions on Navigational Performance in Census*

2000. Retrieved 4th June, 2004, from <http://www.census.gov/srd/papers/pdf/rsm2002-02.pdf>
- Rice, M. (2002, June 2002). *Conventional wisdom in evaluation*. Retrieved 22 March, 2003, 2003, from http://www.utas.edu.au/teachingonline/documents/conventional_wisdom.pdf
- Rivers, D. (2006). *Sample Matching Representative Sampling from Internet Panels*. Retrieved 16 Dec, 2006, from http://web.mit.edu/polisci/portl/cces/material/sample_matching.pdf
- Romano, M. F., & Himmelmann, M. (2002, 25-28 August). *Determinants of Web mode choice in a "Web and paper" survey in a high education population*. Paper presented at the ICIS 2002 The International Conference on Improving Surveys, University of Copenhagen - Denmark.
- Roztock, N., & Lahri, A. N. (2003, 6-9 Jan. 2003). *Is the Applicability of Web-Based Surveys for Academic Research limited to the Field of Information Technology? [Electronic version]*. Paper presented at the The 36th Hawaii International Conference on System Sciences (HICSS'03), Hawaii.
- Schaefer, D. R., & Dillman, D. (1998). Development of a standard e-mail methodology: Results of an experiment. *Public Opinion Quarterly*, *62*(3), 378-397.
- Schonlau, M., D. Ronald, J. F., & Elliott, M. N. (2001). *Conducting Research Surveys via E-mail and the Web [Electronic version]*. USA: RAND.
- Schuldt, B., & Totten, J. (1994). Electronic Mail Vs. Mail Survey Response Rates [electronic version]. *Marketing Research*, *6*(1), 36-44.
- Schuman, H., & Presser, S. (1981). *Questions and Answers in Attitude Surveys: Experiments in Question Form, Wording, and Context*. New York: Academic Press.
- Schwarz, N., & Sudman, S. (1992). *Context Effects in Social and Psychological Research*. New York: Springer-Verlag.
- Shanks, D. (2005). *Human Learning and Memory*. Retrieved 16 March, 2005, from <http://www.psychol.ucl.ac.uk/david.shanks/C530/Lecture%201.pdf>
- Shannon, D., & Bradshaw, C. (2002). A comparison of response rate, response time, and costs of mail and electronic surveys [electronic version]. *The Journal of Experimental Education*, *70*(2), 179-192.
- Shannon, D., Johnson, T., Searcy, S., & Alan, L. (2002, 1/2/02). *Using electronic surveys: advice from survey professionals*. Retrieved 22 March, 2002, from <http://ericae.net/pare/getvn.asp?v=8&n=1>
- Sheehan, K. (2001, January). *E-mail Survey Response Rates: A Review [electronic version]*. Retrieved 3rd November, 2005, from <http://www.ascusc.org/jcmc/vol6/issue2/sheehan.html>
- Sheehan, K., & Hoy, M. (1999). *Using E-mail To Survey Internet Users In The United States: Methodology And Assessment [electronic version]*, from <http://www.ascusc.org/jcmc/vol4/issue3/sheehan.html>
- Sheehan, K., & McMillan, S. (1999). Response variation in e-mail surveys: An exploration. *Journal of Advertising Research*, *39*(4), 45-54.
- Signore, O. (2003). *Internationalization: Motivation*. Retrieved 15th August, 2003, from <http://www.w3c.cnr.it/talks/ICTP/slide51-0.htm>
- Singapore ICT Policy - A 'model' for ASEAN countries. (2002, September 2002 Vo.2). *Singapore ICT Policy - A 'model' for ASEAN countries*. Retrieved 13 May, 2003, from <http://www.mait.com/MAIT%20Policy%20news2.pdf>

- Siwalee, Y. (2001). *A Content Analysis of the Hotel Websites in Thailand*. Unpublished Master. Arst, The University of The Thai Chamber of Commerce. Bangkok (Thailand). Graduate School., Bangkok.
- Slaybaugh, M., & Grossman, E. (2003). *Theory and Practice of Interface Design for the Web*. Retrieved 22nd Dec, 2003, from <http://www.matchstick.com/class/design/>
- Slaybaugh, M., & Grossman, E. (2005). *Theory and Practice of Interface Design for the Web*. Retrieved 17th Jan, 2005, from <http://www.matchstick.com/class/design/>
- Slayden, G. (2005). *Thai-language.com*. Retrieved 27th Feb, 2005, from <http://www.thai-language.com>
- Smith, R., Olah, D., Hansen, B., & Cumbo, D. (2003). The effect of questionnaire length on participant response rate: A case study in the U.S cabinet industry [electronic version]. *Forest Products*, 53(11/12), 33-37.
- Solomon, D. J. (2001). Conducting Web-Based Surveys [Electronic version]. *Practical Assessment, Research & Evaluation*, 7(9).
- Special Broadcasting Service. (2001). *SBS World Guide*. HGB: South Yarra.
- Stewart, J., & Yalonis, C. (2001, April, 2001). *Internet-Based Surveys and Sampling Issues*. Retrieved 11th Sept, 2003, from http://www.communiquepartners.com/white_papers/sampling_issues_and_the_internet_briefing_paper.pdf
- Stoop, I., Jowell, R., & Mohler, P. (2002, 25-28 August). *The European Social Survey : One Survey in Two Dozen Countries*. Paper presented at the ICIS 2002 The International Conference on Improving Surveys, University of Copenhagen - Denmark.
- Strategic Asia. (2003). *Brunei Population*. Retrieved 31st Oct, 2003, from <http://strategicasia.nbr.org/Data/DataSheet/DisplaySheet.aspx?y=11&c=7&i=115&t=&r=>
- Straub, K. (2005). *Seeking clarity on consistency*. Retrieved 7th April, 2005, from <http://www.humanfactors.com/downloads/mar05.asp>
- Supriani, N. H. (2001). *English reading strategies of Indonesian university and high school students*. Unpublished Ph.D., The Royal Melbourne Institute of Technology.
- Suskie, L. A. (1996). *Questionnaire survey research what works* (2 ed.). Florida USA: the Association for Institutional Research.
- Taylor-Powell, E. (1998). *Questionnaire Design: Asking questions with a purpose*. Retrieved 24th Feb, 2005, from http://cf.uwex.edu/ces/pubs/pdf/G3658_2.PDF
- The Government of the Hong Kong Special Administrative Region. (2003, 2 May 2003). *Chief Executive's Commission on Innovation and Technology: First Report: CHAPTER THREE: A NEW VISION: HONG KONG AS CENTRE OF INNOVATION AND TECHNOLOGY*. Retrieved 13 May, 2003, from <http://www.info.gov.hk/tib/roles/first/chap3.htm>
- The Linguasphere Observatory. (2005). *Languages of the World*. Retrieved 19th April, 2005, from <http://www.linguasphere.org/language.html>
- The University of Texas at Austin. (2004, 3 March 2004). *Advantages of Online Surveys*. Retrieved 13th Oct, 2004, from <http://www.utexas.edu/learn/surveys/advantages.html>
- Thuvasethakul, C., & Koanantakool, T. (2002, 25 March). *National ICT Policy in Thailand*. Retrieved 15 April, 2003, from

- <http://www.nectec.or.th/users/htk/publish/20020302-National-ICT-Policy-v16-word.pdf>
- TIAC. (2003, 29 April 2003). *About Technical Information Access Center-TIAC*. Retrieved 2 May, 2003, from <http://www.tiac.or.th/>
- Tourangeau, R., Rips, J., & Rasinski, K. (2000). *The Psychology of Survey Response*. Cambridge, UK: Cambridge University Press.
- Trochim, W. M. (2000, 29 June). *Types of Surveys*. Retrieved 16th Nov, 2004, from www.socialresearchmethods.net/kb/survtype.htm
- Truehits.net. (2003). *Top 100 Thai website in March 2003*. Retrieved 17 April, 2003, from <http://truehits.net/script/top100Mar2003.html>
- Truell, A. (2003). Use of Internet Tools for Survey Research. *Information Technology, Learning & Performance*, 21(1), 31-37.
- Vehovar, V., Koren, G. p., & Manfreda, K. L. (2002). *Reasons for unit and partial nonresponse in Web Surveys*. Retrieved 25 May, 2003, from <http://www.websm.org/nase/nonresp2002.ppt>
- Waddington, H. (2005). *Types of Survey Questions*. Retrieved 16th Feb, 2005, from <http://coe.sdsu.edu/eet/articles/surveyquest/index.htm>
- Wagner, V. (2003). Key installs Web-based survey tool. *Bank Systems + Technology*, 40(1), 16.
- Waksberg, J. (2005a). *What Is a Survey?* Retrieved 28th April, 2004, from <http://www.amstat.org/sections/srms/brochures/survwhat.html>
- Waksberg, J. (2005b). *What Is a Survey?: Designing a Questionnaire*. Retrieved 28th April, 2004, from <http://www.amstat.org/sections/srms/brochures/designquest.pdf>
- Waksberg, J. (2005c). *What Is a Survey?: How to Collect Survey Data*. Retrieved 28th April, 2004, from <http://www.amstat.org/sections/srms/brochures/SurveyData.pdf>
- Waksberg, J. (2005d). *What Is a Survey?: How to plan a survey*. Retrieved 28th April, 2004, from <http://www.amstat.org/sections/srms/brochures/survplan.pdf>
- Waksberg, J. (2005e). *What Is a Survey?: Judging the Quality of a Survey*. Retrieved 28th April, 2004, from <http://www.amstat.org/sections/srms/brochures/Judging.pdf>
- Waksberg, J. (2005f). *What Is a Survey?: More About Mail Surveys*. Retrieved 28th April, 2004, from <http://www.amstat.org/sections/srms/brochures/Mail.pdf>
- Watchfire Corporation. (2005). *About Bobby*. Retrieved 25th Jan, 2005, from <http://bobby.watchfire.com/bobby/html/en/about.jsp>
- websurveyor.com. (2004a). *Web Survey Best Practice: Optimizing On-line Response Rates*. Retrieved 27th April, 2005, from <http://www.websurveyor.com/resources/web-survey-best-practice.asp?c=56>
- websurveyor.com. (2004b, 15th March). *Web Survey Best Practice: Paper and Web Survey Methods Compared*. Retrieved 11th May, 2004, from http://www.websurveyor.com/learn_news0110_bp.asp
- Weible, R., & Wallace, J. (1998). Cyber research: The impact of the Internet on data collection. *Marketing Research*, 10(3), 19-25.
- Woods, J. A. (1995). *Survey Methods: The Dillman Technique*. Retrieved 22nd April, 2005, from <http://www.familypractice.ubc.ca/research/binderprojdesign4.html>
- yourenvoy.com. (2003). *Web Surveys How much? How fast?* Retrieved 30 May, 2003, from <http://www.yourenvoy.com/news.htm>

- Yu, F. (2001, 4 March). *Asia Internet Report: Interview with Ron Poonsaengsathit of Ion Global Thailand*. Retrieved 30 April, 2003, from http://www.asiainternetreport.com/AIR_0103.html
- ZDNet. (2001). Web-Based Surveys: Just Ask Them. *PC Magazine*, 136.
- Zucker, H. G., & Eaton, W. G. (2005). *Sample Size Calculator*. Retrieved 8 June, 2003, from <http://www.surveysystem.com/sscalc.htm>
- Zucker, H. G., & Eaton, W. G. (2006, June 2005). *Survey Design*. Retrieved 16 Sept, 2006, from <http://www.surveysystem.com/sdesign.htm>

APPENDICES

Appendix 1: Web Content Accessibility Guidelines 1.0

Web Content Accessibility Guidelines 1.0

W3C Recommendation 5-May-1999

This version:

<http://www.w3.org/TR/1999/WAI-WEBCONTENT-19990505>

([plain text](#), [PostScript](#), [PDF](#), [gzip tar file of HTML](#), [zip archive of HTML](#))

Latest version:

<http://www.w3.org/TR/WAI-WEBCONTENT>

Previous version:

<http://www.w3.org/TR/1999/WAI-WEBCONTENT-19990324>

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Abstract

These guidelines explain how to make *Web content* accessible to people with disabilities. The guidelines are intended for all *Web content developers* (page authors and site designers) and for developers of *authoring tools*. The primary goal of these guidelines is to promote accessibility. However, following them will also make Web content more available to *all* users, whatever *user agent* they are using (e.g., desktop browser, voice browser, mobile phone, automobile-based personal computer, etc.) or

constraints they may be operating under (e.g., noisy surroundings, under- or over-illuminated rooms, in a hands-free environment, etc.). Following these guidelines will also help people find information on the Web more quickly. These guidelines do not discourage content developers from using images, video, etc., but rather explain how to make multimedia content more accessible to a wide audience.

This is a reference document for accessibility principles and design ideas. Some of the strategies discussed in this document address certain Web internationalization and mobile access concerns. However, this document focuses on accessibility and does not fully address the related concerns of other W3C Activities. Please consult the [W3C Mobile Access Activity home page](#) and the [W3C Internationalization Activity home page](#) for more information.

This document is meant to be stable and therefore does not provide specific information about browser support for different technologies as that information changes rapidly. Instead, the [Web Accessibility Initiative](#) (WAI) Web site provides such information (refer to [\[WAI-UA-SUPPORT\]](#)).

This document includes an appendix that organizes all of the *checkpoints* by topic and priority. The checkpoints in the appendix link to their definitions in the current document. The topics identified in the appendix include images, multimedia, tables, frames, forms, and scripts. The appendix is available as either a [tabular summary of checkpoints](#) or as a [simple list of checkpoints](#).

A separate document, entitled "Techniques for Web Content Accessibility Guidelines 1.0" ([\[TECHNIQUES\]](#)), explains how to implement the checkpoints defined in the current document. The Techniques Document discusses each checkpoint in more detail and provides examples using the Hypertext Markup Language (HTML), Cascading Style Sheets (CSS), Synchronized Multimedia Integration Language (SMIL), and the Mathematical Markup Language (MathML). The Techniques Document also includes techniques for document validation and testing, and an index of HTML elements and attributes (and which techniques use them). The Techniques Document has been designed to track changes in technology and is expected to be updated more frequently than the current document. Note. Not all browsers or

multimedia tools may support the features described in the guidelines. In particular, new features of HTML 4.0 or CSS 1 or CSS 2 may not be supported.

"Web Content Accessibility Guidelines 1.0" is part of a series of accessibility guidelines published by the [Web Accessibility Initiative](#). The series also includes User Agent Accessibility Guidelines ([\[WAI-USERAGENT\]](#)) and Authoring Tool Accessibility Guidelines ([\[WAI-AUTOOLS\]](#)).

Status of this document

This document has been reviewed by W3C Members and other interested parties and has been endorsed by the Director as a W3C Recommendation. It is a stable document and may be used as reference material or cited as a normative reference from another documents. W3C's role in making the Recommendation is to draw attention to the specification and to promote its widespread deployment. This enhances the functionality and universality of the Web.

The English version of this specification is the only normative version. However, for translations in other languages see <http://www.w3.org/WAI/GL/WAI-WEBCONTENT-TRANSLATIONS>.

The list of known errors in this document is available at <http://www.w3.org/WAI/GL/WAI-WEBCONTENT-ERRATA>. Please report errors in this document to wai-wcag-editor@w3.org.

A list of current W3C Recommendations and other technical documents can be found at <http://www.w3.org/TR>.

This document has been produced as part of the W3C [Web Accessibility Initiative](#). The goal of the [Web Content Guidelines Working Group](#) is discussed in the [Working Group charter](#).

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The appendix list of checkpoints is available as either a [tabular summary of checkpoints](#) or as a [simple list of checkpoints](#).

1. Introduction

For those unfamiliar with accessibility issues pertaining to Web page design, consider that many users may be operating in contexts very different from your own:

They may not be able to see, hear, move, or may not be able to process some types of information easily or at all.

They may have difficulty reading or comprehending text.

They may not have or be able to use a keyboard or mouse.

They may have a text-only screen, a small screen, or a slow Internet connection.

They may not speak or understand fluently the language in which the document is written.

They may be in a situation where their eyes, ears, or hands are busy or interfered with (e.g., driving to work, working in a loud environment, etc.).

They may have an early version of a browser, a different browser entirely, a voice browser, or a different operating system.

Content developers must consider these different situations during page design. While there are several situations to consider, each accessible design choice generally benefits several disability groups at once and the Web community as a whole. For example, by using [*style sheets*](#) to control font styles and eliminating the FONT element, HTML authors will have more control over their pages, make those pages more accessible to people with low vision, and by sharing the style sheets, will often shorten page download times for all users.

The guidelines discuss accessibility issues and provide accessible design solutions. They address typical scenarios (similar to the font style example) that may pose problems for users with certain disabilities. For example, the [first guideline](#) explains how content developers can make images accessible. Some users may not be able to see images, others may use text-based browsers that do not support images, while others may have turned off support for images (e.g., due to a slow Internet connection). The guidelines do not suggest avoiding images as a way to improve accessibility. Instead, they explain that providing a [*text equivalent*](#) of the image will make it accessible.

How does a text equivalent make the image accessible? Both words in "text equivalent" are important:

Text content can be presented to the user as synthesized speech, braille, and visually-displayed text. Each of these three mechanisms uses a different sense -- ears for synthesized speech, tactile for braille, and eyes for visually-displayed text -- making the information accessible to groups representing a variety of sensory and other disabilities.

In order to be useful, the text must convey the same function or purpose as the image. For example, consider a text equivalent for a photographic image of the Earth as seen from outer space. If the purpose of the image is mostly that of decoration, then the text "Photograph of the Earth as seen from outer space" might fulfill the necessary function. If the purpose of the photograph is to illustrate specific information about world geography, then the text equivalent should convey that information. If the photograph has been designed to tell the user to select the image (e.g., by clicking on it) for information about the earth, equivalent text would be "Information about the

Earth". Thus, if the text conveys the same function or purpose for the user with a disability as the image does for other users, then it can be considered a text equivalent.

Note that, in addition to benefitting users with disabilities, text equivalents can help all users find pages more quickly, since search robots can use the text when indexing the pages.

While Web content developers must provide text equivalents for images and other multimedia content, it is the responsibility of *user agents* (e.g., browsers and assistive technologies such as *screen readers*, *braille displays*, etc.) to present the information to the user.

Non-text equivalents of text (e.g., icons, pre-recorded speech, or a video of a person translating the text into sign language) can make documents accessible to people who may have difficulty accessing written text, including many individuals with cognitive disabilities, learning disabilities, and deafness. Non-text equivalents of text can also be helpful to non-readers. An *auditory description* is an example of a non-text equivalent of visual information. An auditory description of a multimedia presentation's visual track benefits people who cannot see the visual information.

2. Themes of Accessible Design

The guidelines address two general themes: ensuring graceful transformation, and making content understandable and navigable.

2.1 Ensuring Graceful Transformation

By following these guidelines, content developers can create pages that transform gracefully. Pages that transform gracefully remain accessible despite any of the constraints described in the [introduction](#), including physical, sensory, and cognitive disabilities, work constraints, and technological barriers. Here are some keys to designing pages that transform gracefully:

Separate structure from presentation (refer to the difference between *content*, *structure*, and *presentation*).

Provide text (including *text equivalents*). Text can be rendered in ways that are available to almost all browsing devices and accessible to almost all users.

Create documents that work even if the user cannot see and/or hear. Provide information that serves the same purpose or function as audio or video in ways suited to alternate sensory channels as well. This does not mean creating a prerecorded audio version of an entire site to make it accessible to users who are blind. Users who are blind can use *screen reader* technology to render all text information in a page.

Create documents that do not rely on one type of hardware. Pages should be usable by people without mice, with small screens, low resolution screens, black and white screens, no screens, with only voice or text output, etc.

The theme of graceful transformation is addressed primarily by guidelines 1 to 11.

2.2 Making Content Understandable and Navigable

Content developers should make content understandable and navigable. This includes not only making the language clear and simple, but also providing understandable mechanisms for navigating within and between pages. Providing navigation tools and orientation information in pages will maximize accessibility and usability. Not all users can make use of visual clues such as image maps, proportional scroll bars, side-by-side frames, or graphics that guide sighted users of graphical desktop browsers. Users also lose contextual information when they can only view a portion of a page, either because they are accessing the page one word at a time (speech synthesis or *braille display*), or one section at a time (small display, or a magnified display). Without orientation information, users may not be able to understand very large tables, lists, menus, etc.

The theme of making content understandable and navigable is addressed primarily in guidelines 12 to 14.

3. How the Guidelines are Organized

This document includes fourteen guidelines, or general principles of accessible design. Each guideline includes:

The guideline number.

The statement of the guideline.

Guideline navigation links. Three links allow navigation to the next guideline (right arrow icon), the previous guideline (left arrow icon), or the current guideline's position in the table of contents (up arrow icon).

The rationale behind the guideline and some groups of users who benefit from it.

A list of checkpoint definitions.

The checkpoint definitions in each guideline explain how the guideline applies in typical content development scenarios. Each checkpoint definition includes:

The checkpoint number.

The statement of the checkpoint.

The priority of the checkpoint. Priority 1 checkpoints are highlighted through the use of style sheets.

Optional informative notes, clarifying examples, and cross references to related guidelines or checkpoints.

A link to a section of the Techniques Document ([\[TECHNIQUES\]](#)) where implementations and examples of the checkpoint are discussed.

Each checkpoint is intended to be specific enough so that someone reviewing a page or site may verify that the checkpoint has been satisfied.

3.1 Document conventions

The following editorial conventions are used throughout this document:

Element names are in uppercase letters.

Attribute names are quoted in lowercase letters.

Links to definitions are highlighted through the use of style sheets.

4. Priorities

Each checkpoint has a priority level assigned by the Working Group based on the checkpoint's impact on accessibility.

[Priority 1]

A Web content developer must satisfy this checkpoint. Otherwise, one or more groups will find it impossible to access information in the document. Satisfying this checkpoint is a basic requirement for some groups to be able to use Web documents.

[Priority 2]

A Web content developer should satisfy this checkpoint. Otherwise, one or more groups will find it difficult to access information in the document. Satisfying this checkpoint will remove significant barriers to accessing Web documents.

[Priority 3]

A Web content developer may address this checkpoint. Otherwise, one or more groups will find it somewhat difficult to access information in the document. Satisfying this checkpoint will improve access to Web documents.

Some checkpoints specify a priority level that may change under certain (indicated) conditions.

5. Conformance

This section defines three levels of conformance to this document:

Conformance Level "A": all Priority 1 checkpoints are satisfied;

Conformance Level "Double-A": all Priority 1 and 2 checkpoints are satisfied;

Conformance Level "Triple-A": all Priority 1, 2, and 3 checkpoints are satisfied;

Note. Conformance levels are spelled out in text so they may be understood when rendered to speech.

Claims of conformance to this document must use one of the following two forms.

Form 1: Specify:

The guidelines title: "Web Content Accessibility Guidelines 1.0"

The guidelines URI: <http://www.w3.org/TR/1999/WAI-WEBCONTENT-19990505>

The conformance level satisfied: "A", "Double-A", or "Triple-A".

The scope covered by the claim (e.g., page, site, or defined portion of a site.).

Example of Form 1:

This page conforms to W3C's "Web Content Accessibility Guidelines 1.0", available at <http://www.w3.org/TR/1999/WAI-WEBCONTENT-19990505>, level Double-A.

Form 2: Include, on each page claiming conformance, one of three icons provided by W3C and link the icon to the appropriate W3C explanation of the claim. Information about the icons and how to insert them in pages is available at [\[WCAG-ICONS\]](#).

6. Web Content Accessibility Guidelines

Guideline 1. Provide equivalent alternatives to auditory and visual content.

Provide content that, when presented to the user, conveys essentially the same function or purpose as auditory or visual content.

Although some people cannot use images, movies, sounds, applets, etc. directly, they may still use pages that include *equivalent* information to the visual or auditory content. The equivalent information must serve the same purpose as the visual or auditory content. Thus, a text equivalent for an image of an upward arrow that links to a table of contents could be "Go to table of contents". In some cases, an equivalent should also describe the appearance of visual content (e.g., for complex charts, billboards, or diagrams) or the sound of auditory content (e.g., for audio samples used in education).

This guideline emphasizes the importance of providing *text equivalents* of non-text content (images, pre-recorded audio, video). The power of text equivalents lies in

their capacity to be rendered in ways that are accessible to people from various disability groups using a variety of technologies. Text can be readily output to speech synthesizers and *braille displays*, and can be presented visually (in a variety of sizes) on computer displays and paper. Synthesized speech is critical for individuals who are blind and for many people with the reading difficulties that often accompany cognitive disabilities, learning disabilities, and deafness. Braille is essential for individuals who are both deaf and blind, as well as many individuals whose only sensory disability is blindness. Text displayed visually benefits users who are deaf as well as the majority of Web users.

Providing non-text equivalents (e.g., pictures, videos, and pre-recorded audio) of text is also beneficial to some users, especially nonreaders or people who have difficulty reading. In movies or visual presentations, visual action such as body language or other visual cues may not be accompanied by enough audio information to convey the same information. Unless verbal descriptions of this visual information are provided, people who cannot see (or look at) the visual content will not be able to perceive it.

Checkpoints:

1.1 Provide a text equivalent for every non-text element (e.g., via "alt", "longdesc", or in element content). *This includes:* images, graphical representations of text (including symbols), image map regions, animations (e.g., animated GIFs), applets and programmatic objects, ascii art, frames, scripts, images used as list bullets, spacers, graphical buttons, sounds (played with or without user interaction), stand-alone audio files, audio tracks of video, and video. **[Priority 1]**

For example, in HTML:

Use "alt" for the IMG, INPUT, and APPLET elements, or provide a text equivalent in the content of the OBJECT and APPLET elements.

For complex content (e.g., a chart) where the "alt" text does not provide a complete text equivalent, provide an additional description using, for example, "longdesc" with IMG or FRAME, a link inside an OBJECT element, or a [description link](#).

For image maps, either use the "alt" attribute with AREA, or use the MAP element with A elements (and other text) as content.

Refer also to [checkpoint 9.1](#) and [checkpoint 13.10](#).

[Techniques for checkpoint 1.1](#)

1.2 Provide redundant text links for each active region of a server-side image map.

[Priority 1]

Refer also to [checkpoint 1.5](#) and [checkpoint 9.1](#).

[Techniques for checkpoint 1.2](#)

1.3 [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. [Priority 1]

Synchronize the *auditory description* with the audio track as per [checkpoint 1.4](#). Refer to [checkpoint 1.1](#) for information about textual equivalents for visual information.

[Techniques for checkpoint 1.3](#)

1.4 For any time-based multimedia presentation (e.g., a movie or animation), synchronize equivalent alternatives (e.g., captions or auditory descriptions of the visual track) with the presentation. [Priority 1]

[Techniques for checkpoint 1.4](#)

1.5 [Until user agents](#) render text equivalents for client-side image map links, provide redundant text links for each active region of a client-side image map. [Priority 3]

Refer also to [checkpoint 1.2](#) and [checkpoint 9.1](#).

[Techniques for checkpoint 1.5](#)

Guideline 2. Don't rely on color alone.

Ensure that text and graphics are understandable when viewed without color.

If color alone is used to convey information, people who cannot differentiate between certain colors and users with devices that have non-color or non-visual displays will not receive the information. When foreground and background colors are too close to the same hue, they may not provide sufficient contrast when viewed using monochrome displays or by people with different types of color deficits.

Checkpoints:

2.1 Ensure that all information conveyed with color is also available without color, for example from context or markup. **[Priority 1]**

[Techniques for checkpoint 2.1](#)

2.2 Ensure that foreground and background color combinations provide sufficient contrast when viewed by someone having color deficits or when viewed on a black and white screen. [Priority 2 for images, Priority 3 for text].

[Techniques for checkpoint 2.2](#)

Guideline 3. Use markup and style sheets and do so properly.

Mark up documents with the proper structural elements. Control presentation with style sheets rather than with presentation elements and attributes.

Using markup improperly -- not according to specification -- hinders accessibility. Misusing markup for a presentation effect (e.g., using a table for layout or a header to change the font size) makes it difficult for users with specialized software to understand the organization of the page or to navigate through it. Furthermore, using presentation markup rather than structural markup to convey structure (e.g., constructing what looks like a table of data with an HTML PRE element) makes it difficult to render a page intelligibly to other devices (refer to the description of *[difference between content, structure, and presentation](#)*).

Content developers may be tempted to use (or misuse) constructs that achieve a desired formatting effect on older browsers. They must be aware that these practices cause accessibility problems and must consider whether the formatting effect is so critical as to warrant making the document inaccessible to some users.

At the other extreme, content developers must not sacrifice appropriate markup because a certain browser or assistive technology does not process it correctly. For example, it is appropriate to use the TABLE element in HTML to mark up *tabular information* even though some older screen readers may not handle side-by-side text correctly (refer to [checkpoint 10.3](#)). Using TABLE correctly and creating tables that transform gracefully (refer to [guideline 5](#)) makes it possible for software to render tables other than as two-dimensional grids.

Checkpoints:

3.1 When an appropriate markup language exists, use markup rather than images to convey information. [Priority 2]

For example, use MathML to mark up mathematical equations, and *style sheets* to format text and control layout. Also, avoid using images to represent text -- use text and style sheets instead. Refer also to [guideline 6](#) and [guideline 11](#).

[Techniques for checkpoint 3.1](#)

3.2 Create documents that validate to published formal grammars. [Priority 2]

For example, include a document type declaration at the beginning of a document that refers to a published DTD (e.g., the strict HTML 4.0 DTD).

[Techniques for checkpoint 3.2](#)

3.3 Use style sheets to control layout and presentation. [Priority 2]

For example, use the CSS 'font' property instead of the HTML FONT element to control font styles.

[Techniques for checkpoint 3.3](#)

3.4 Use relative rather than absolute units in markup language attribute values and style sheet property values. [Priority 2]

For example, in CSS, use 'em' or percentage lengths rather than 'pt' or 'cm', which are absolute units. If absolute units are used, validate that the rendered content is usable (refer to the [section on validation](#)).

[Techniques for checkpoint 3.4](#)

3.5 Use header elements to convey document structure and use them according to specification. [Priority 2]

For example, in HTML, use H2 to indicate a subsection of H1. Do not use headers for font effects.

[Techniques for checkpoint 3.5](#)

3.6 Mark up lists and list items properly. [Priority 2]

For example, in HTML, nest OL, UL, and DL lists properly.

[Techniques for checkpoint 3.6](#)

3.7 Mark up quotations. Do not use quotation markup for formatting effects such as indentation. [Priority 2]

For example, in HTML, use the Q and BLOCKQUOTE elements to markup short and longer quotations, respectively.

[Techniques for checkpoint 3.7](#)

Guideline 4. Clarify natural language usage

Use markup that facilitates pronunciation or interpretation of abbreviated or foreign text.

When content developers mark up natural language changes in a document, speech synthesizers and braille devices can automatically switch to the new language, making the document more accessible to multilingual users. Content developers should identify the predominant *natural language* of a document's content (through markup or HTTP headers). Content developers should also provide expansions of abbreviations and acronyms.

In addition to helping assistive technologies, natural language markup allows search engines to find key words and identify documents in a desired language. Natural

language markup also improves readability of the Web for all people, including those with learning disabilities, cognitive disabilities, or people who are deaf.

When abbreviations and natural language changes are not identified, they may be indecipherable when machine-spoken or brailled.

Checkpoints:

4.1 Clearly identify changes in the natural language of a document's text and any *text equivalents* (e.g., captions). [Priority 1]

For example, in HTML use the "lang" attribute. In XML, use "xml:lang".

[Techniques for checkpoint 4.1](#)

4.2 Specify the expansion of each abbreviation or acronym in a document where it first occurs. [Priority 3]

For example, in HTML, use the "title" attribute of the ABBR and ACRONYM elements. Providing the expansion in the main body of the document also helps document usability.

[Techniques for checkpoint 4.2](#)

4.3 Identify the primary natural language of a document. [Priority 3]

For example, in HTML set the "lang" attribute on the HTML element. In XML, use "xml:lang". Server operators should configure servers to take advantage of HTTP content negotiation mechanisms ([\[RFC2068\]](#), section 14.13) so that clients can automatically retrieve documents of the preferred language.

[Techniques for checkpoint 4.3](#)

Guideline 5. Create tables that transform gracefully.

Ensure that tables have necessary markup to be transformed by accessible browsers and other user agents.

Tables should be used to mark up truly *tabular information* ("data tables"). Content developers should avoid using them to lay out pages ("layout tables"). Tables for any use also present special problems to users of *screen readers* (refer to [checkpoint 10.3](#)).

Some *user agents* allow users to navigate among table cells and access header and other table cell information. Unless marked-up properly, these tables will not provide user agents with the appropriate information. ([Refer also to guideline 3.](#))

The following checkpoints will directly benefit people who access a table through auditory means (e.g., a screen reader or an automobile-based personal computer) or who view only a portion of the page at a time (e.g., users with blindness or low vision using speech output or a *braille display*, or other users of devices with small displays, etc.).

Checkpoints:

5.1 For data tables, identify row and column headers. **[Priority 1]**

For example, in HTML, use TD to identify data cells and TH to identify headers.

[Techniques for checkpoint 5.1](#)

5.2 For data tables that have two or more logical levels of row or column headers, use markup to associate data cells and header cells. **[Priority 1]**

For example, in HTML, use THEAD, TFOOT, and TBODY to group rows, COL and COLGROUP to group columns, and the "axis", "scope", and "headers" attributes, to describe more complex relationships among data.

[Techniques for checkpoint 5.2](#)

5.3 Do not use tables for layout unless the table makes sense when linearized. Otherwise, if the table does not make sense, provide an alternative equivalent (which may be a *linearized version*). **[Priority 2]**

Note. *Once user agents* support style sheet positioning, tables should not be used for layout. [Refer also to checkpoint 3.3.](#)

[Techniques for checkpoint 5.3](#)

5.4 If a table is used for layout, do not use any structural markup for the purpose of visual formatting. [Priority 2]

For example, in HTML do not use the TH element to cause the content of a (non-table header) cell to be displayed centered and in bold.

[Techniques for checkpoint 5.4](#)

5.5 Provide summaries for tables. [Priority 3]

For example, in HTML, use the "summary" attribute of the TABLE element.

[Techniques for checkpoint 5.5](#)

5.6 Provide abbreviations for header labels. [Priority 3]

For example, in HTML, use the "abbr" attribute on the TH element.

[Techniques for checkpoint 5.6](#)

[Refer also to checkpoint 10.3.](#)

Guideline 6. Ensure that pages featuring new technologies transform gracefully.

Ensure that pages are accessible even when newer technologies are not supported or are turned off.

Although content developers are encouraged to use new technologies that solve problems raised by existing technologies, they should know how to make their pages still work with older browsers and people who choose to turn off features.

Checkpoints:

6.1 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. [Priority 1]

When content is organized logically, it will be rendered in a meaningful order when style sheets are turned off or not supported.

[Techniques for checkpoint 6.1](#)

6.2 Ensure that equivalents for dynamic content are updated when the dynamic content changes. [Priority 1]

[Techniques for checkpoint 6.2](#)

6.3 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. [Priority 1]

For example, ensure that links that trigger scripts work when scripts are turned off or not supported (e.g., do not use "javascript:" as the link target). If it is not possible to make the page usable without scripts, provide a text equivalent with the NOSCRIPT element, or use a server-side script instead of a client-side script, or provide an alternative accessible page as per [checkpoint 11.4](#). [Refer also to guideline 1](#).

[Techniques for checkpoint 6.3](#)

6.4 For scripts and applets, ensure that event handlers are input device-independent. [Priority 2]

Refer to the definition of [device independence](#).

[Techniques for checkpoint 6.4](#)

6.5 Ensure that dynamic content is accessible or provide an alternative presentation or page. [Priority 2]

For example, in HTML, use NOFRAMES at the end of each frameset. For some applications, server-side scripts may be more accessible than client-side scripts.

[Techniques for checkpoint 6.5](#)

[Refer also to checkpoint 11.4](#).

Guideline 7. Ensure user control of time-sensitive content changes.

Ensure that moving, blinking, scrolling, or auto-updating objects or pages may be paused or stopped.

Some people with cognitive or visual disabilities are unable to read moving text quickly enough or at all. Movement can also cause such a distraction that the rest of the page becomes unreadable for people with cognitive disabilities. [*Screen readers*](#) are unable to read moving text. People with physical disabilities might not be able to move quickly or accurately enough to interact with moving objects.

Note. All of the following checkpoints involve some content developer responsibility [*until user agents*](#) provide adequate feature control mechanisms.

Checkpoints:

7.1 [*Until user agents*](#) allow users to control flickering, avoid causing the screen to flicker. [Priority 1]

Note. People with photosensitive epilepsy can have seizures triggered by flickering or flashing in the 4 to 59 flashes per second (Hertz) range with a peak sensitivity at 20 flashes per second as well as quick changes from dark to light (like strobe lights).

[Techniques for checkpoint 7.1](#)

7.2 [*Until user agents*](#) allow users to control blinking, avoid causing content to blink (i.e., change presentation at a regular rate, such as turning on and off). [Priority 2]

[Techniques for checkpoint 7.2](#)

7.3 [*Until user agents*](#) allow users to freeze moving content, avoid movement in pages. [Priority 2]

When a page includes moving content, provide a mechanism within a script or applet to allow users to freeze motion or updates. Using style sheets with scripting to create movement allows users to turn off or override the effect more easily. [Refer also to guideline 8](#).

[Techniques for checkpoint 7.3](#)

7.4 *Until user agents* provide the ability to stop the refresh, do not create periodically auto-refreshing pages. [Priority 2]

For example, in HTML, don't cause pages to auto-refresh with "HTTP-EQUIV=refresh" until user agents allow users to turn off the feature.

[Techniques for checkpoint 7.4](#)

7.5 *Until user agents* provide the ability to stop auto-redirect, do not use markup to redirect pages automatically. Instead, configure the server to perform redirects. [Priority 2]

[Techniques for checkpoint 7.5](#)

Note. The BLINK and MARQUEE elements are not defined in any W3C HTML specification and should not be used. [Refer also to guideline 11.](#)

Guideline 8. Ensure direct accessibility of embedded user interfaces.

Ensure that the user interface follows principles of accessible design: device-independent access to functionality, keyboard operability, self-voicing, etc.

When an embedded object has its "own interface", the interface -- like the interface to the browser itself -- must be accessible. If the interface of the embedded object cannot be made accessible, an alternative accessible solution must be provided.

Note. For information about accessible interfaces, please consult the User Agent Accessibility Guidelines ([\[WAI-USERAGENT\]](#)) and the Authoring Tool Accessibility Guidelines ([\[WAI-AUTOOL\]](#)).

Checkpoint:

8.1 Make programmatic elements such as scripts and applets directly accessible or compatible with assistive technologies [Priority 1 if functionality is *important* and not presented elsewhere, otherwise Priority 2.]

[Refer also to guideline 6.](#)

[Techniques for checkpoint 8.1](#)

Guideline 9. Design for device-independence.

Use features that enable activation of page elements via a variety of input devices.

[Device-independent](#) access means that the user may interact with the user agent or document with a preferred input (or output) device -- mouse, keyboard, voice, head wand, or other. If, for example, a form control can only be activated with a mouse or other pointing device, someone who is using the page without sight, with voice input, or with a keyboard or who is using some other non-pointing input device will not be able to use the form.

Note. Providing text equivalents for image maps or images used as links makes it possible for users to interact with them without a pointing device. [Refer also to guideline 1.](#)

Generally, pages that allow keyboard interaction are also accessible through speech input or a command line interface.

Checkpoints:

9.1 Provide client-side image maps instead of server-side image maps except where the regions cannot be defined with an available geometric shape. **[Priority 1]**

Refer also to [checkpoint 1.1](#), [checkpoint 1.2](#), and [checkpoint 1.5](#).

[Techniques for checkpoint 9.1](#)

9.2 Ensure that any element that has its own interface can be operated in a device-independent manner. [Priority 2]

Refer to the definition of [device independence](#).

[Refer also to guideline 8.](#)

[Techniques for checkpoint 9.2](#)

9.3 For scripts, specify logical event handlers rather than device-dependent event handlers. [Priority 2]

[Techniques for checkpoint 9.3](#)

9.4 Create a logical tab order through links, form controls, and objects. [Priority 3]

For example, in HTML, specify tab order via the "tabindex" attribute or ensure a logical page design.

[Techniques for checkpoint 9.4](#)

9.5 Provide keyboard shortcuts to important links (including those in *client-side image maps*), form controls, and groups of form controls. [Priority 3]

For example, in HTML, specify shortcuts via the "accesskey" attribute.

[Techniques for checkpoint 9.5](#)

Guideline 10. Use interim solutions.

Use interim accessibility solutions so that assistive technologies and older browsers will operate correctly.

For example, older browsers do not allow users to navigate to empty edit boxes. Older screen readers read lists of consecutive links as one link. These active elements are therefore difficult or impossible to access. Also, changing the current window or popping up new windows can be very disorienting to users who cannot see that this has happened.

Note. The following checkpoints apply *until user agents* (including *assistive technologies*) address these issues. These checkpoints are classified as "interim", meaning that the Web Content Guidelines Working Group considers them to be valid and necessary to Web accessibility *as of the publication of this document*. However, the Working Group does not expect these checkpoints to be necessary in the future, once Web technologies have incorporated anticipated features or capabilities.

Checkpoints:

10.1 *Until user agents* allow users to turn off spawned windows, do not cause pop-ups or other windows to appear and do not change the current window without informing the user. [Priority 2]

For example, in HTML, avoid using a frame whose target is a new window.

[Techniques for checkpoint 10.1](#)

10.2 *Until user agents* support explicit associations between labels and form controls, for all form controls with implicitly associated labels, ensure that the label is properly positioned. [Priority 2]

The label must immediately precede its control on the same line (allowing more than one control/label per line) or be in the line preceding the control (with only one label and one control per line). [Refer also to checkpoint 12.4.](#)

[Techniques for checkpoint 10.2](#)

10.3 *Until user agents* (including assistive technologies) render side-by-side text correctly, provide a linear text alternative (on the current page or some other) for *all* tables that lay out text in parallel, word-wrapped columns. [Priority 3]

Note. Please consult the definition of *linearized table*. This checkpoint benefits people with *user agents* (such as some *screen readers*) that are unable to handle blocks of text presented side-by-side; the checkpoint should not discourage content developers from using tables to represent *tabular information*.

[Techniques for checkpoint 10.3](#)

10.4 *Until user agents* handle empty controls correctly, include default, place-holding characters in edit boxes and text areas. [Priority 3]

For example, in HTML, do this for TEXTAREA and INPUT.

[Techniques for checkpoint 10.4](#)

10.5 *Until user agents* (including assistive technologies) render adjacent links distinctly, include non-link, printable characters (surrounded by spaces) between adjacent links. [Priority 3]

[Techniques for checkpoint 10.5](#)

Guideline 11. Use W3C technologies and guidelines.

Use W3C technologies (according to specification) and follow accessibility guidelines. Where it is not possible to use a W3C technology, or doing so results in material that does not transform gracefully, provide an alternative version of the content that is accessible.

The current guidelines recommend W3C technologies (e.g., HTML, CSS, etc.) for several reasons:

W3C technologies include "built-in" accessibility features.

W3C specifications undergo early review to ensure that accessibility issues are considered during the design phase.

W3C specifications are developed in an open, industry consensus process.

Many non-W3C formats (e.g., PDF, Shockwave, etc.) require viewing with either plug-ins or stand-alone applications. Often, these formats cannot be viewed or navigated with standard *user agents* (including *assistive technologies*). Avoiding non-W3C and non-standard features (proprietary elements, attributes, properties, and extensions) will tend to make pages more accessible to more people using a wider variety of hardware and software. When inaccessible technologies (proprietary or not) must be used, equivalent accessible pages must be provided.

Even when W3C technologies are used, they must be used in accordance with accessibility guidelines. When using new technologies, ensure that they transform gracefully ([Refer also to guideline 6.](#)).

Note. Converting documents (from PDF, PostScript, RTF, etc.) to W3C markup languages (HTML, XML) does not always create an accessible document. Therefore, validate each page for accessibility and usability after the conversion process (refer to the [section on validation](#)). If a page does not readily convert, either revise the page until its original representation converts appropriately or provide an HTML or plain text version.

Checkpoints:

11.1 Use W3C technologies when they are available and appropriate for a task and use the latest versions when supported. [Priority 2]

Refer to the [list of references](#) for information about where to find the latest W3C specifications and [\[WAI-UA-SUPPORT\]](#) for information about user agent support for W3C technologies.

[Techniques for checkpoint 11.1](#)

11.2 Avoid deprecated features of W3C technologies. [Priority 2]

For example, in HTML, don't use the *deprecated* FONT element; use style sheets instead (e.g., the 'font' property in CSS).

[Techniques for checkpoint 11.2](#)

11.3 Provide information so that users may receive documents according to their preferences (e.g., language, content type, etc.) [Priority 3]

Note. Use content negotiation where possible.

[Techniques for checkpoint 11.3](#)

11.4 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 (or functionality), and is updated as often as the inaccessible (original) page.

[Priority 1]

[Techniques for checkpoint 11.4](#)

Note. Content developers should only resort to alternative pages when other solutions fail because alternative pages are generally updated less often than "primary" pages. An out-of-date page may be as frustrating as one that is inaccessible since, in both cases, the information presented on the original page is unavailable. Automatically generating alternative pages may lead to more frequent updates, but content developers must still be careful to ensure that generated pages always make sense, and that users are able to navigate a site by following links on primary pages, alternative

pages, or both. Before resorting to an alternative page, reconsider the design of the original page; making it accessible is likely to improve it for all users.

Guideline 12. Provide context and orientation information.

Provide context and orientation information to help users understand complex pages or elements.

Grouping elements and providing contextual information about the relationships between elements can be useful for all users. Complex relationships between parts of a page may be difficult for people with cognitive disabilities and people with visual disabilities to interpret.

Checkpoints:

12.1 Title each frame to facilitate frame identification and navigation. **[Priority 1]**

For example, in HTML use the "title" attribute on FRAME elements.

[Techniques for checkpoint 12.1](#)

12.2 Describe the purpose of frames and how frames relate to each other if it is not obvious by frame titles alone. [Priority 2]

For example, in HTML, use "longdesc," or a *[description link](#)*.

[Techniques for checkpoint 12.2](#)

12.3 Divide large blocks of information into more manageable groups where natural and appropriate. [Priority 2]

For example, in HTML, use OPTGROUP to group OPTION elements inside a SELECT; group form controls with FIELDSET and LEGEND; use nested lists where appropriate; use headings to structure documents, etc. [Refer also to guideline 3.](#)

[Techniques for checkpoint 12.3](#)

12.4 Associate labels explicitly with their controls. [Priority 2]

For example, in HTML use LABEL and its "for" attribute.

[Techniques for checkpoint 12.4](#)

Guideline 13. Provide clear navigation mechanisms.

Provide clear and consistent navigation mechanisms -- orientation information, navigation bars, a site map, etc. -- to increase the likelihood that a person will find what they are looking for at a site.

Clear and consistent *navigation mechanisms* are important to people with cognitive disabilities or blindness, and benefit all users.

Checkpoints:

13.1 Clearly identify the target of each link. [Priority 2]

Link text should be meaningful enough to make sense when read out of context -- either on its own or as part of a sequence of links. Link text should also be terse.

For example, in HTML, write "Information about version 4.3" instead of "click here". In addition to clear link text, content developers may further clarify the target of a link with an informative link title (e.g., in HTML, the "title" attribute).

[Techniques for checkpoint 13.1](#)

13.2 Provide metadata to add semantic information to pages and sites. [Priority 2]

For example, use RDF ([\[RDF\]](#)) to indicate the document's author, the type of content, etc.

Note. Some HTML *user agents* can build navigation tools from document relations described by the HTML LINK element and "rel" or "rev" attributes (e.g., rel="next", rel="previous", rel="index", etc.). [Refer also to checkpoint 13.5.](#)

[Techniques for checkpoint 13.2](#)

13.3 Provide information about the general layout of a site (e.g., a site map or table of contents). [Priority 2]

In describing site layout, highlight and explain available accessibility features.

[Techniques for checkpoint 13.3](#)

13.4 Use navigation mechanisms in a consistent manner. [Priority 2]

[Techniques for checkpoint 13.4](#)

13.5 Provide navigation bars to highlight and give access to the navigation mechanism. [Priority 3]

[Techniques for checkpoint 13.5](#)

13.6 Group related links, identify the group (for user agents), and, *until user agents* do so, provide a way to bypass the group. [Priority 3]

[Techniques for checkpoint 13.6](#)

13.7 If search functions are provided, enable different types of searches for different skill levels and preferences. [Priority 3]

[Techniques for checkpoint 13.7](#)

13.8 Place distinguishing information at the beginning of headings, paragraphs, lists, etc. [Priority 3]

Note. This is commonly referred to as "front-loading" and is especially helpful for people accessing information with serial devices such as speech synthesizers.

[Techniques for checkpoint 13.8](#)

13.9 Provide information about document collections (i.e., documents comprising multiple pages.). [Priority 3]

For example, in HTML specify document collections with the LINK element and the "rel" and "rev" attributes. Another way to create a collection is by building an archive (e.g., with zip, tar and gzip, stuffit, etc.) of the multiple pages.

Note. The performance improvement gained by offline processing can make browsing much less expensive for people with disabilities who may be browsing slowly.

[Techniques for checkpoint 13.9](#)

13.10 Provide a means to skip over multi-line ASCII art. [Priority 3]

Refer to [checkpoint 1.1](#) and [the example of ascii art in the glossary](#).

[Techniques for checkpoint 13.10](#)

Guideline 14. Ensure that documents are clear and simple.

Ensure that documents are clear and simple so they may be more easily understood.

Consistent page layout, recognizable graphics, and easy to understand language benefit all users. In particular, they help people with cognitive disabilities or who have difficulty reading. (However, ensure that images have text equivalents for people who are blind, have low vision, or for any user who cannot or has chosen not to view graphics. [Refer also to guideline 1.](#))

Using clear and simple language promotes effective communication. Access to written information can be difficult for people who have cognitive or learning disabilities. Using clear and simple language also benefits people whose first language differs from your own, including those people who communicate primarily in sign language.

Checkpoints:

14.1 Use the clearest and simplest language appropriate for a site's content.

[Priority 1]

[Techniques for checkpoint 14.1](#)

14.2 Supplement text with graphic or auditory presentations where they will facilitate comprehension of the page. [Priority 3]

[Refer also to guideline 1.](#)

[Techniques for checkpoint 14.2](#)

14.3 Create a style of presentation that is consistent across pages. [Priority 3]

[Techniques for checkpoint 14.3](#)

Appendix A. -- Validation

Validate accessibility with automatic tools and human review. Automated methods are generally rapid and convenient but cannot identify all accessibility issues. Human review can help ensure clarity of language and ease of navigation.

Begin using validation methods at the earliest stages of development. Accessibility issues identified early are easier to correct and avoid.

Following are some important validation methods, discussed in more detail in the [section on validation in the Techniques Document](#).

Use an automated accessibility tool and browser validation tool. Please note that software tools do not address all accessibility issues, such as the meaningfulness of link text, the applicability of a *[text equivalent](#)*, etc.

Validate syntax (e.g., HTML, XML, etc.).

Validate style sheets (e.g., CSS).

Use a text-only browser or emulator.

Use multiple graphic browsers, with:

sounds and graphics loaded,

graphics not loaded,

sounds not loaded,

no mouse,

frames, scripts, style sheets, and applets not loaded

Use several browsers, old and new.

Use a self-voicing browser, a screen reader, magnification software, a small display, etc.

Use spell and grammar checkers. A person reading a page with a speech synthesizer may not be able to decipher the synthesizer's best guess for a word with a spelling error. Eliminating grammar problems increases comprehension.

Review the document for clarity and simplicity. Readability statistics, such as those generated by some word processors may be useful indicators of clarity and simplicity. Better still, ask an experienced (human) editor to review written content for clarity. Editors can also improve the usability of documents by identifying potentially sensitive cultural issues that might arise due to language or icon usage.

Invite people with disabilities to review documents. Expert and novice users with disabilities will provide valuable feedback about accessibility or usability problems and their severity.

Appendix B. -- Glossary

Accessible

Content is accessible when it may be used by someone with a disability.

Applet

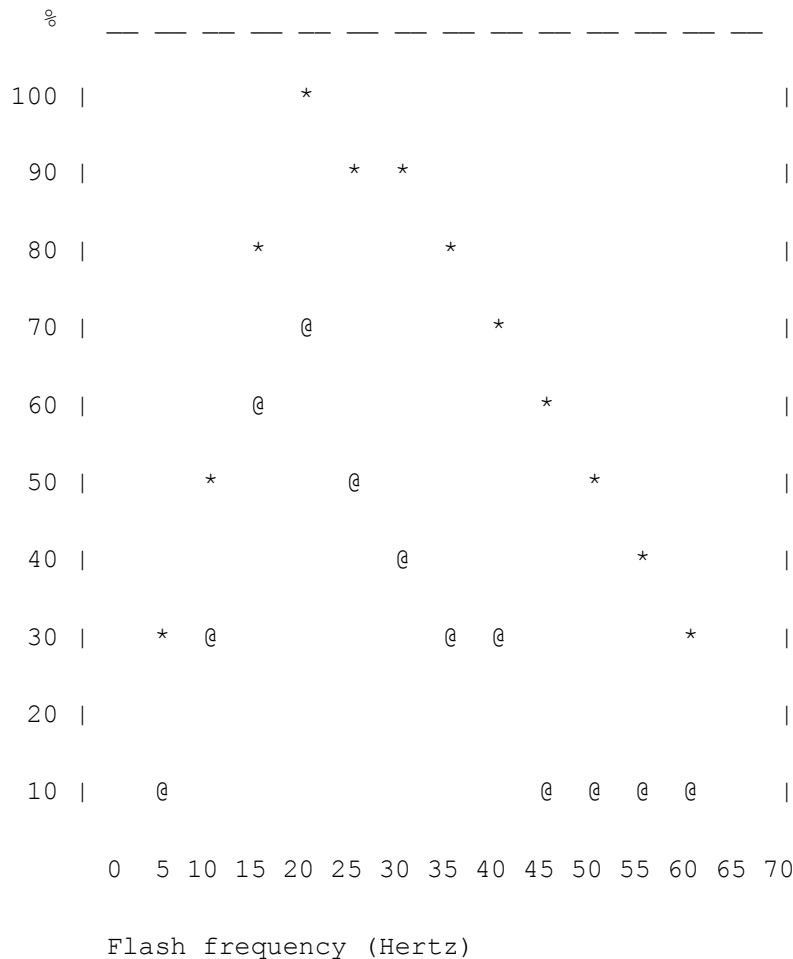
A program inserted into a Web page.

Assistive technology

Software or hardware that has been specifically designed to assist people with disabilities in carrying out daily activities. Assistive technology includes wheelchairs, reading machines, devices for grasping, etc. In the area of Web Accessibility, common software-based assistive technologies include screen readers, screen magnifiers, speech synthesizers, and voice input software that operate in conjunction with graphical desktop browsers (among other *user agents*). Hardware assistive technologies include alternative keyboards and pointing devices.

ASCII art

ASCII art refers to text characters and symbols that are combined to create an image. For example ";-)" is the smiley emoticon. The following is an ascii figure showing the relationship between flash frequency and photoconvulsive response in patients with eyes open and closed [[skip over ascii figure](#) or consult a [description of chart](#)]:



Authoring tool

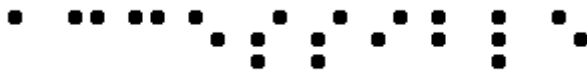
HTML editors, document conversion tools, tools that generate Web content from databases are all authoring tools. Refer to the "Authoring Tool Accessibility Guidelines" ([\[WAI-AUTOOLS\]](#)) for information about developing accessible tools.

Backward compatible

Design that continues to work with earlier versions of a language, program, etc.

Braille

Braille uses six raised dots in different patterns to represent letters and numbers to be read by people who are blind with their fingertips. The word "Accessible" in braille follows:



A *braille display*, commonly referred to as a "dynamic braille display," raises or lowers dot patterns on command from an electronic device, usually a computer. The result is a line of braille that can change from moment to moment. Current dynamic braille displays range in size from one cell (six or eight dots) to an eighty-cell line, most having between twelve and twenty cells per line.

Content developer

Someone who authors Web pages or designs Web sites.

Deprecated

A deprecated element or attribute is one that has been outdated by newer constructs. Deprecated elements may become obsolete in future versions of HTML. The [index of HTML elements and attributes in the Techniques Document](#) indicates which elements and attributes are deprecated in HTML 4.0.

Authors should avoid using deprecated elements and attributes. User agents should continue to support for reasons of backward compatibility.

Device independent

Users must be able to interact with a user agent (and the document it renders) using the supported input and output devices of their choice and according to their needs. Input devices may include pointing devices, keyboards, braille devices, head wands, microphones, and others. Output devices may include monitors, speech synthesizers, and braille devices.

Please note that "device-independent support" does not mean that user agents must support every input or output device. User agents should offer redundant input and

output mechanisms for those devices that are supported. For example, if a user agent supports keyboard and mouse input, users should be able to interact with all features using either the keyboard or the mouse.

Document Content, Structure, and Presentation

The content of a document refers to what it says to the user through natural language, images, sounds, movies, animations, etc. The structure of a document is how it is organized logically (e.g., by chapter, with an introduction and table of contents, etc.). An *element* (e.g., P, STRONG, BLOCKQUOTE in HTML) that specifies document structure is called a structural element. The presentation of a document is how the document is rendered (e.g., as print, as a two-dimensional graphical presentation, as a text-only presentation, as synthesized speech, as braille, etc.) An *element* that specifies document presentation (e.g., B, FONT, CENTER) is called a presentation element.

Consider a document header, for example. The content of the header is what the header says (e.g., "Sailboats"). In HTML, the header is a structural element marked up with, for example, an H2 element. Finally, the presentation of the header might be a bold block text in the margin, a centered line of text, a title spoken with a certain voice style (like an aural font), etc.

Dynamic HTML (DHTML)

DHTML is the marketing term applied to a mixture of standards including HTML, *style sheets*, the Document Object Model [\[DOM1\]](#) and scripting. However, there is no W3C specification that formally defines DHTML. Most guidelines may be applicable to applications using DHTML, however the following guidelines focus on issues related to scripting and style sheets: [guideline 1](#), [guideline 3](#), [guideline 6](#), [guideline 7](#), and [guideline 9](#).

Element

This document uses the term "element" both in the strict SGML sense (an element is a syntactic construct) and more generally to mean a type of content (such as video or

sound) or a logical construct (such as a header or list). The second sense emphasizes that a guideline inspired by HTML could easily apply to another markup language.

Note that some (SGML) elements have content that is rendered (e.g., the P, LI, or TABLE elements in HTML), some are replaced by external content (e.g., IMG), and some affect processing (e.g., STYLE and SCRIPT cause information to be processed by a style sheet or script engine). An element that causes text characters to be part of the document is called a text element.

Equivalent

Content is "equivalent" to other content when both fulfill essentially the same function or purpose upon presentation to the user. In the context of this document, the equivalent must fulfill essentially the same function for the person with a disability (at least insofar as is feasible, given the nature of the disability and the state of technology), as the primary content does for the person without any disability. For example, the text "The Full Moon" might convey the same information as an image of a full moon when presented to users. Note that equivalent information focuses on fulfilling the same function. If the image is part of a link and understanding the image is crucial to guessing the link target, an equivalent must also give users an idea of the link target. Providing equivalent information for inaccessible content is one of the primary ways authors can make their documents accessible to people with disabilities.

As part of fulfilling the same function of content an equivalent may involve a description of that content (i.e., what the content looks like or sounds like). For example, in order for users to understand the information conveyed by a complex chart, authors should describe the visual information in the chart.

Since text content can be presented to the user as synthesized speech, braille, and visually-displayed text, these guidelines require *text equivalents* for graphic and audio information. Text equivalents must be written so that they convey all essential content. *Non-text equivalents* (e.g., an auditory description of a visual presentation, a video of a person telling a story using sign language as an equivalent for a written story, etc.) also improve accessibility for people who cannot access visual information or written text, including many individuals with blindness, cognitive disabilities, learning disabilities, and deafness.

Equivalent information may be provided in a number of ways, including through attributes (e.g., a text value for the "alt" attribute in HTML and SMIL), as part of element content (e.g., the OBJECT in HTML), as part of the document's prose, or via a linked document (e.g., designated by the "longdesc" attribute in HTML or a *description link*). Depending on the complexity of the equivalent, it may be necessary to combine techniques (e.g., use "alt" for an abbreviated equivalent, useful to familiar readers, in addition to "longdesc" for a link to more complete information, useful to first-time readers). The details of how and when to provide equivalent information are part of the Techniques Document ([\[TECHNIQUES\]](#)).

A *text transcript* is a text equivalent of audio information that includes spoken words and non-spoken sounds such as sound effects. A *caption* is a text transcript for the audio track of a video presentation that is synchronized with the video and audio tracks. Captions are generally rendered visually by being superimposed over the video, which benefits people who are deaf and hard-of-hearing, and anyone who cannot hear the audio (e.g., when in a crowded room). A *collated text transcript* combines (collates) captions with text descriptions of video information (descriptions of the actions, body language, graphics, and scene changes of the video track). These text equivalents make presentations accessible to people who are deaf-blind and to people who cannot play movies, animations, etc. It also makes the information available to search engines.

One example of a non-text equivalent is an *auditory description* of the key visual elements of a presentation. The description is either a prerecorded human voice or a synthesized voice (recorded or generated on the fly). The auditory description is synchronized with the audio track of the presentation, usually during natural pauses in the audio track. Auditory descriptions include information about actions, body language, graphics, and scene changes.

Image

A graphical presentation.

Image map

An image that has been divided into regions with associated actions. Clicking on an active region causes an action to occur.

When a user clicks on an active region of a client-side image map, the user agent calculates in which region the click occurred and follows the link associated with that region. Clicking on an active region of a server-side image map causes the coordinates of the click to be sent to a server, which then performs some action.

Content developers can make client-side image maps accessible by providing device-independent access to the same links associated with the image map's regions. Client-side image maps allow the user agent to provide immediate feedback as to whether or not the user's pointer is over an active region.

Important

Information in a document is important if understanding that information is crucial to understanding the document.

Linearized table

A table rendering process where the contents of the cells become a series of paragraphs (e.g., down the page) one after another. The paragraphs will occur in the same order as the cells are defined in the document source. Cells should make sense when read in order and should include [structural elements](#) (that create paragraphs, headers, lists, etc.) so the page makes sense after linearization.

Link text

The rendered text content of a link.

Natural Language

Spoken, written, or signed human languages such as French, Japanese, American Sign Language, and braille. The natural language of content may be indicated with the "lang" attribute in HTML ([\[HTML40\]](#), section 8.1) and the "xml:lang" attribute in XML ([\[XML\]](#), section 2.12).

Navigation Mechanism

A navigation mechanism is any means by which a user can navigate a page or site.

Some typical mechanisms include:

navigation bars

A navigation bar is a collection of links to the most important parts of a document or site.

site maps

A site map provides a global view of the organization of a page or site.

tables of contents

A table of contents generally lists (and links to) the most important sections of a document.

Personal Digital Assistant (PDA)

A PDA is a small, portable computing device. Most PDAs are used to track personal data such as calendars, contacts, and electronic mail. A PDA is generally a handheld device with a small screen that allows input from various sources.

Screen magnifier

A software program that magnifies a portion of the screen, so that it can be more easily viewed. Screen magnifiers are used primarily by individuals with low vision.

Screen reader

A software program that reads the contents of the screen aloud to a user. Screen readers are used primarily by individuals who are blind. Screen readers can usually only read text that is printed, not painted, to the screen.

Style sheets

A style sheet is a set of statements that specify presentation of a document. Style sheets may have three different origins: they may be written by content providers,

created by users, or built into user agents. In CSS ([\[CSS2\]](#)), the interaction of content provider, user, and user agent style sheets is called the *cascade*.

Presentation markup is markup that achieves a stylistic (rather than structuring) effect such as the B or I elements in HTML. Note that the STRONG and EM elements are not considered presentation markup since they convey information that is independent of a particular font style.

Tabular information

When tables are used to represent logical relationships among data -- text, numbers, images, etc., that information is called "tabular information" and the tables are called "data tables". The relationships expressed by a table may be rendered visually (usually on a two-dimensional grid), aurally (often preceding cells with header information), or in other formats.

Until user agents ...

In most of the checkpoints, content developers are asked to ensure the accessibility of their pages and sites. However, there are accessibility needs that would be more appropriately met by *user agents* (including *assistive technologies*). As of the publication of this document, not all user agents or assistive technologies provide the accessibility control users require (e.g., some user agents may not allow users to turn off blinking content, or some screen readers may not handle tables well). Checkpoints that contain the phrase "until user agents ..." require content developers to provide additional support for accessibility until most user agents readily available to their audience include the necessary accessibility features.

Note. The W3C WAI Web site (refer to [\[WAI-UA-SUPPORT\]](#)) provides information about user agent support for accessibility features. Content developers are encouraged to consult this page regularly for updated information.

User agent

Software to access Web content, including desktop graphical browsers, text browsers, voice browsers, mobile phones, multimedia players, plug-ins, and some software

assistive technologies used in conjunction with browsers such as screen readers, screen magnifiers, and voice recognition software.

Acknowledgments

Web Content Guidelines Working Group Co-Chairs:

[Chuck Letourneau](#), Starling Access Services

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[Judy Brewer](#) and [Daniel Dardailier](#)

We wish to thank the following people who have contributed their time and valuable comments to shaping these guidelines:

Harvey Bingham, Kevin Carey, Chetz Colwell, Neal Ewers, Geoff Freed, Al Gilman, Larry Goldberg, Jon Gunderson, Eric Hansen, Phill Jenkins, Leonard Kasday, George Kerscher, Marja-Riitta Koivunen, Josh Krieger, Scott Luebking, William Loughborough, Murray Maloney, Charles McCathieNevile, MegaZone (Livingston Enterprises), Masafumi Nakane, Mark Novak, Charles Oppermann, Mike Paciello, David Pawson, Michael Pieper, Greg Rosmaita, Liam Quinn, Dave Raggett, T.V. Raman, Robert Savellis, Jutta Treviranus, Steve Tyler, Jaap van Lelieveld, and Jason White

The original draft of this document is based on "The Unified Web Site Accessibility Guidelines" ([\[UWSAG\]](#)) compiled by the Trace R & D Center at the University of Wisconsin. That document includes a list of additional contributors.

References

For the latest version of any W3C specification please consult the list of [W3C Technical Reports](#).

[CSS1]

"CSS, level 1 Recommendation", B. Bos, H. Wium Lie, eds., 17 December 1996, revised 11 January 1999. The CSS1 Recommendation is:

<http://www.w3.org/TR/1999/REC-CSS1-19990111>.

The latest version of CSS1 is available at: <http://www.w3.org/TR/REC-CSS1>.

[CSS2]

"CSS, level 2 Recommendation", B. Bos, H. Wium Lie, C. Lilley, and I. Jacobs, eds., 12 May 1998. The CSS2 Recommendation is: [http://www.w3.org/TR/1998/REC-](http://www.w3.org/TR/1998/REC-CSS2-19980512)

[CSS2-19980512](http://www.w3.org/TR/1998/REC-CSS2-19980512).

The latest version of CSS2 is available at: <http://www.w3.org/TR/REC-CSS2>.

[DOM1]

"Document Object Model (DOM) Level 1 Specification", V. Apparao, S. Byrne, M. Champion, S. Isaacs, I. Jacobs, A. Le Hors, G. Nicol, J. Robie, R. Sutor, C. Wilson, and L. Wood, eds., 1 October 1998. The DOM Level 1 Recommendation is:

<http://www.w3.org/TR/1998/REC-DOM-Level-1-19981001>.

The latest version of DOM Level 1 is available at: <http://www.w3.org/TR/REC-DOM-Level-1>

[HTML40]

"HTML 4.0 Recommendation", D. Raggett, A. Le Hors, and I. Jacobs, eds., 17 December 1997, revised 24 April 1998. The HTML 4.0 Recommendation is:

<http://www.w3.org/TR/1998/REC-html40-19980424>.

The latest version of HTML 4.0 is available at: <http://www.w3.org/TR/REC-html40>.

[HTML32]

"HTML 3.2 Recommendation", D. Raggett, ed., 14 January 1997. The latest version of HTML 3.2 is available at: <http://www.w3.org/TR/REC-html32>.

[MATHML]

"Mathematical Markup Language", P. Ion and R. Miner, eds., 7 April 1998. The MathML 1.0 Recommendation is: <http://www.w3.org/TR/1998/REC-MathML-19980407>.

The latest version of MathML 1.0 is available at: <http://www.w3.org/TRREC-MathML>.

[PNG]

"PNG (Portable Network Graphics) Specification", T. Boutell, ed., T. Lane, contributing ed., 1 October 1996. The latest version of PNG 1.0 is: <http://www.w3.org/TR/REC-png>.

[RDF]

"Resource Description Framework (RDF) Model and Syntax Specification", O. Lassila, R. Swick, eds., 22 February 1999. The RDF Recommendation is: <http://www.w3.org/TR/1999/REC-rdf-syntax-19990222>.

The latest version of RDF 1.0 is available at: <http://www.w3.org/TR/REC-rdf-syntax>

[RFC2068]

["HTTP Version 1.1"](#), R. Fielding, J. Gettys, J. Mogul, H. Frystyk Nielsen, and T. Berners-Lee, January 1997.

[SMIL]

"Synchronized Multimedia Integration Language (SMIL) 1.0 Specification", P. Hoschka, ed., 15 June 1998. The SMIL 1.0 Recommendation is: <http://www.w3.org/TR/1998/REC-smil-19980615>

The latest version of SMIL 1.0 is available at: <http://www.w3.org/TR/REC-smil>

[TECHNIQUES]

"Techniques for Web Content Accessibility Guidelines 1.0", W. Chisholm, G. Vanderheiden, I. Jacobs, eds. This document explains how to implement the checkpoints defined in "Web Content Accessibility Guidelines 1.0". The latest draft of the techniques is available at: <http://www.w3.org/TR/WAI-WEBCONTENT-TECHS/>

[WAI-AUTOOLS]

"Authoring Tool Accessibility Guidelines", J. Treviranus, J. Richards, I. Jacobs, C. McCathieNevile, eds. The latest Working Draft of these guidelines for designing accessible authoring tools is available at: <http://www.w3.org/TR/WAI-AUTOOLS/>

[WAI-UA-SUPPORT]

This page documents known support by user agents (including assistive technologies) of some accessibility features listed in this document. The page is available at:

<http://www.w3.org/WAI/Resources/WAI-UA-Support>

[WAI-USERAGENT]

"User Agent Accessibility Guidelines", J. Gunderson and I. Jacobs, eds. The latest Working Draft of these guidelines for designing accessible user agents is available at:

<http://www.w3.org/TR/WAI-USERAGENT/>

[WCAG-ICONS]

Information about conformance icons for this document and how to use them is available at <http://www.w3.org/WAI/WCAG1-Conformance.html>

[UWSAG]

"The Unified Web Site Accessibility Guidelines", G. Vanderheiden, W. Chisholm, eds. The Unified Web Site Guidelines were compiled by the [Trace R & D Center](#) at the University of Wisconsin under funding from the National Institute on Disability and Rehabilitation Research (NIDRR), U.S. Dept. of Education. This document is available at: http://www.tracecenter.org/docs/html_guidelines/version8.htm

[XML]

"Extensible Markup Language (XML) 1.0.", T. Bray, J. Paoli, C.M. Sperberg-McQueen, eds., 10 February 1998. The XML 1.0 Recommendation is:

<http://www.w3.org/TR/1998/REC-xml-19980210>.

The latest version of XML 1.0 is available at: <http://www.w3.org/TR/REC-xml>

Source: <http://www.w3.org/TR/WAI-WEBCONTENT/>

Appendix 2: Types of Questions

Dichotomous questions

1. Have you ever been to Maryland?

- Yes
- No

Filter or contingency questions

2. Do you like ice cream?

- Yes (Go to question 3)
- No (Go to question 4)

3. What is your favorite ice cream flavor?

- Vanilla
- Chocolate
- Chocolate Chip Cookie Dough
- Cherry Garcia
- Other

4. Do you like cake?

- Yes
- No

Guttman scales

5. Please select the statement that you agree with:

- I am willing to travel 1 mile to find an ACME Bookstore.
- I am willing to travel 3 miles to find an ACME Bookstore.
- I am willing to travel 5 miles to find an ACME Bookstore.
- I am willing to travel 10 miles to find an ACME Bookstore.

Likert scales

6. The customer care representative was helpful.

Strongly disagree	Disagree	Neutral	Agree	Strongly Agree
1	2	3	4	5
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Semantic differential scales

7. The customer care representative was...

	Very much	Much	Neither	Much	Very much	
	1	2	3	4	5	
helpful	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	unhelpful
friendly	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	unfriendly
polite	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	rude

Matrix questions

8. For your academic and research endeavours, how often do you use the following types of information?

	Never						Very Frequently
	1	2	3	4	5	6	7
Information on museums	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Information on galleries	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Information on specific art collections	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Descriptions of works of art (text)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Reproductions of works of art (images)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Biographical information about artists	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Biographical information about artists	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

9. For what purpose do you generally use visual materials? Please identify how important for your academic and research work are each of the following tasks.

	Not Important						Very Important
	1	2	3	4	5	6	7
Analysis							
To study an artist's technique	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
To compare several images	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
To document the contents of an image	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
To interpret images in a historical context	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Expression							
To gain ideas and inspiration	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
To communicate and express ideas	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Manipulation							
To obtain a copy of the image	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
To edit and reuse the image	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Multiple-option questions

10. What methods do you use to purchase flight tickets? (Mark all that apply)

- Internet Travel Agency
- Non-Internet Travel Agency
- Directly with Airline
- Other

Single-choice questions

11. What method did you use the last time you purchased flight tickets?

- Internet Travel Agency
- Non-Internet Travel Agency
- Directly with Airline
- Other

Nominal questions

12. What is your education level?

- 1 - High School or lower
- 2 - Some College
- 3 - College Graduate
- 4 - Some Graduate School
- 5 - Master's Degree
- 6 - Doctorate

Enter the correct number: _____

Ordinal questions

13. Please rank the following the following vegetables from best (1) to worst (5):

_____ Broccoli

_____ Carrots

_____ Potatoes

_____ Arugula

_____ Spinach

Open-ended questions

14. Do you have any comments for us?

Source: http://lap.umd.edu/survey_design/examples_all.html

Appendix 3: A Check List of Question Wording

de Vaus (2002) indicates a check list of question wording that covers all issues that survey researchers need to consider as followed.

1. Is the language simple?
2. Can the question be shortened?
3. Is the question double-barreled?
4. Is the question leading?
5. Is the question negative?
6. Is the respondent likely to have the necessary knowledge?
7. Will the words have the same meaning for everyone?
8. Is there a prestige bias?
9. Is the question ambiguous?
10. Is the question too precise?
11. Is the frame of reference for the question sufficiently clear?
12. Does the question artificially create opinions?
13. Is personal or impersonal wording preferable?
14. Is the question wording unnecessarily detailed or objectionable?
15. Does the question have dangling alternatives?
16. Does the question contain unnecessary qualifiers?
17. Is the question a “dead giveaway”?

Appendix 4: A Comparison between European and Japanese Networks Symbols



: -)	<i>Regular smile</i>	(^_^)	<i>Regular smile</i>
: -(<i>Sad</i>	(^o^;>)	<i>Excuse me</i>
; -)	<i>Wink</i>	(^^;)	<i>Cold sweat</i>
: -))	<i>Very happy</i>	(^o^)	<i>Happy</i>
: -o	<i>Wow</i>	(*^o^*)	<i>Exciting</i>
: -	<i>Grim</i>	(_o_)	<i>I'm Sorry</i>
: -	<i>Anger</i>	(^.^)	<i>Woman's smile</i>
8-)	<i>Smile/Glasses</i>	(*^o^;)	<i>Sorry</i>
: ^)	<i>Happy</i>	(;_;	<i>Weeping</i>
: ^(\	<i>Unhappy</i>	\(^_^)/	<i>Bonzai smiley</i>

Source: <http://www.nytimes.com/library/cyber/week/0812smile.html>

Appendix 5: Population (in millions) of Online Non-English-Speakers

Table 1: Population of Online non-English-speakers

(end of year)	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	Proportion of total pop. In language zone	upper limit (M)
												(no. of people living in each language zone)
Spanish	0.2	0.8	1.8	13	21	35	50	60	68	80	0.24	332
Japanese	2	7	9	20	39	48	61	74	88	105	0.84	125
German	0.5	3.5	6.3	14	22	37	43	53	62	71	0.72	98
French	0.2	2	3.4	9.9	17	18	23	31	41	49	0.68	72
Chinese	0.1	1.2	2	10	31	48	78	120	170	220	0.25	885
Scandinavian	2	2.2	3.2	7.7	9	11	16	15.4	16.3	17	0.88	19.3
Italian	0.1	0.5	1.8	9.7	12	20	24	30	35	42	0.74	57
Dutch	0.05	1	2	5.8	7	11	13	11.8	14.2	14.5	0.73	20
Korean	0.01	0.05	0.8	5	17	25	28	35	43	50	0.67	75
Portuguese	0.02	0.2	1.2	4	11	14	19	26	32	38	0.22	170
Other Non-English:		11.4	15.1	6.4	28.8	41	64	81.4	110.2	136.5		
English	40	72	91	148	192	231	233.8	260	280	300	0.59	508
TOTAL:	50	117	151	245	391	529	626.8	782	941	1100	0.19	5792
Total Non-English:	10	45	71	109	211	307	418	540	680	820	0.13	6400

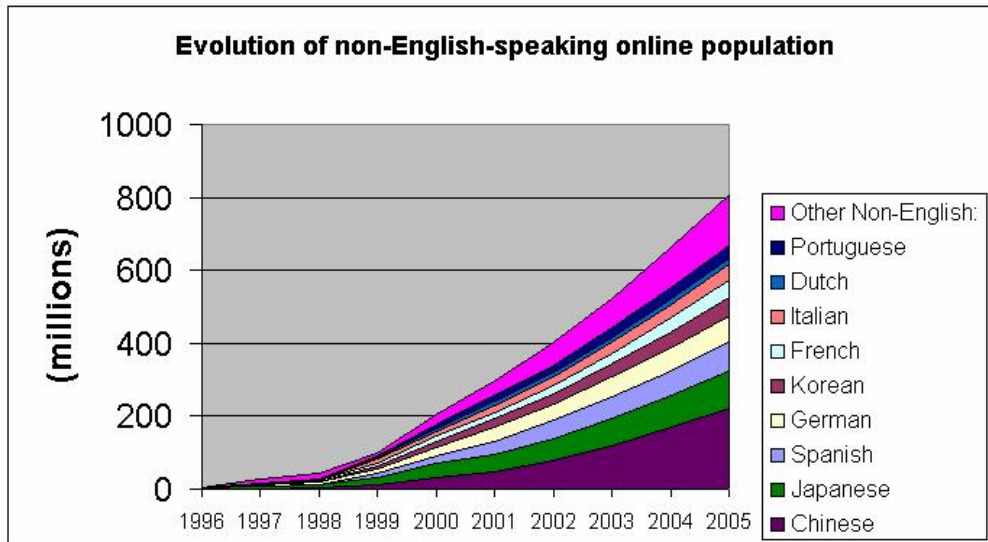


Figure 9. 1: Population of online non-English-speakers

Source: <http://global-reach.biz/globstats/evol.html>

Appendix 6: Pilot version of web-based questionnaire

UNIVERSITY
HOME DIRECTORIES SEARCH TOUR CONTACT

แบบสำรวจ การใช้เว็บไซต์ของมหาวิทยาลัย

Welcome to

ก่อนที่จะตอบแบบสอบถาม โปรดแน่ใจว่าท่านได้เคยใช้เว็บไซต์ของ เพื่อสืบค้นข้อมูลซึ่งท่านสนใจ หรือข้อมูลซึ่งคาดว่าจะพบในเว็บไซค์มาก่อน

การสำรวจครั้งนี้เป็นส่วนหนึ่งของการพัฒนาเว็บไซต์ของ ความคิดเห็นและความรู้สึกของผู้เข้าชมเว็บไซต์ เป็นสิ่งสำคัญที่เราต้องการทราบ เจตคติที่แท้จริงของท่านจะส่งผลให้เว็บไซต์ของ : สนองตอบความต้องการของผู้ใช้ได้ดียิ่งขึ้น

แบบสำรวจนี้ประกอบด้วยคำถามประมาณ 30 ข้อซึ่งแบ่งเป็นส่วนต่างๆ ดังนี้

- ส่วนที่ 1 การตอบแบบสอบถามทางอินเทอร์เน็ต
- ส่วนที่ 2 ข้อมูลส่วนบุคคล
- ส่วนที่ 3 เกี่ยวกับเว็บไซต์ของ
- ส่วนที่ 4 เกี่ยวกับการใช้ email ของ

การเปลี่ยนคำตอบ
สำหรับ โปรดคลิกที่ตัวเลือกอื่นในข้อเดียวกัน
สำหรับ คลิกซ้ำที่ตัวเลือกเดิมเพื่อยกเลิกการเลือก

ส่วนที่ 1 การตอบแบบสอบถามทางอินเทอร์เน็ต

1. โปรดเลือกเหตุผลหลักที่ทำให้ท่านตัดสินใจตอบแบบสอบถามนี้?
หมายเหตุ - ท่านสามารถเลือกตอบได้มากกว่าหนึ่งเหตุผล

- วิธีการเชิญชวนให้ตอบแบบสอบถาม
- ประเด็นของแบบสอบถาม
- ความสำคัญของเนื้อหาในแบบสอบถาม
- เพราะแบบสอบถามเป็นของมหาวิทยาลัย

อื่น ๆ

2. โปรดบอก ถ้าหากท่านได้รับการเชิญชวนให้ตอบแบบสอบถามทางอินเทอร์เน็ต ข้อใดเป็นเหตุผลหลักซึ่งทำให้ท่านตัดสินใจ?
หมายเหตุ - ท่านสามารถเลือกตอบได้มากกว่าหนึ่งเหตุผล

- ความสำคัญของเนื้อหาในแบบสอบถาม
- ความน่าสนใจของเนื้อหาในแบบสอบถาม
- เวลาที่ต้องใช้ในการตอบแบบสอบถาม
- หน่วยงานที่จัดทำแบบสอบถาม
- ของรางวัล

อื่นๆ

ส่วนที่ 2 ข้อมูลส่วนบุคคล

โปรดเลือกตอบคำถามเหล่านี้

กำลังศึกษาอยู่ใน ในระดับ

ในคณะ

กำลังทำงานอยู่ใน ซึ่งขณะนี้ท่านเป็น

ผู้เยี่ยมชมจากสถาบันอื่นๆ ซึ่งขณะนี้ท่านเป็น

ท่านได้ทำแบบสอบถามไป 20 %

ส่วนที่ 3 เกี่ยวกับเว็บไซต์ของ

1. ท่านเข้ามาเยี่ยมชมเว็บไซต์ของ โปรดประมาณเดี๋ยวบ่อยครั้งแค่ไหน?

- ทุกวัน
- ทุกสัปดาห์
- ทุกเดือน
- น้อยกว่าเดือนละครึ่ง

โปรดแสดงความคิดเห็นของท่านเกี่ยวกับการใช้เว็บไซต์ของ ตามคำถามข้างล่างนี้ หากท่านพบว่ามีความหมายซึ่งท่านเห็นด้วย และไม่เห็นด้วยเหมือนกัน โปรดเลือกตอบข้อที่ท่านรู้สึกว่าจะเกิดขึ้นบ่อยที่สุด หรือเห็นด้วยมากที่สุด

คำถาม	เห็นด้วยอย่างยิ่ง	เห็นด้วย	ไม่แน่ใจ	ไม่เห็นด้วย	ไม่เห็นด้วยอย่างยิ่ง
2. ฉันพบข้อมูลซึ่งเป็นประโยชน์ต่อการศึกษาของฉัน	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. สามารถพบข้อมูลที่ต้องการได้ง่าย	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. ฉันพบว่าการจัดหมวดหมู่ในเว็บไซต์ชัดเจน และใช้ได้ง่าย	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5. ฉันคิดว่าเว็บไซต์ของ <input type="text"/> มีความน่าสนใจมากกว่าคู่แข่ง	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6. สามารถเข้าถึงข้อมูลที่ต้องการได้อย่างรวดเร็ว (โดยคลิกน้อยครั้ง)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7. ข้อมูลในเว็บไซต์เข้าใจยาก	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
8. รู้สึกประทับใจ <input type="text"/> จากการเข้าชมเว็บไซต์	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

9. รู้สึกยากในการหาข้อมูลต่าง ๆ
10. รู้สึกว่าเข้าใจว่าต้องทำอะไร และจะคลิกต่อไปที่ใด
11. เว็บไซต์ของ ตอบสนองกับความต้องการของฉัน
12. คิดว่า เป็นมหาวิทยาลัยที่มีเว็บไซต์ที่ดี

โปรดตอบคำถามต่อไปนี้ หากท่านกำลังศึกษาอยู่ใน มศว

13. เมื่อใช้เว็บไซต์ของ ทำให้รู้สึกภาคภูมิใจในสถาบัน
14. ฉันสามารถเห็นภาพของนิสิตที่มีชีวิตชีวาได้จากเว็บไซต์ของ
15. เว็บไซต์ของ มีส่วนสนับสนุนให้ฉันศึกษาใน มศว
16. เว็บไซต์ของ มีส่วนช่วยให้ฉันศึกษาใน มศว ดียิ่งขึ้น

โปรดตอบคำถามต่อไปนี้ หากท่านกำลังทำงานอยู่ใน มหาวิทยาลัย

17. เว็บไซต์ของ ทำให้รู้สึกภาคภูมิใจที่ทำงานอยู่ในสถาบันแห่งนี้

โปรดตอบคำถามต่อไปนี้ หากท่านกำลังศึกษาอยู่ใน มศว

18. โปรดจัดอันดับการเข้าชมส่วนต่างๆ ของ เว็บไซต์ตามความถี่ของการใช้ จากมากที่สุดไปอย่างน้อยที่สุด

หมายเหตุ - อันดับ 1 หมายถึงใช้บ่อยที่สุด อันดับ 10 หมายถึงใช้น้อยที่สุด

- ปฏิทินทางวิชาการ
- ห้องสมุดกลาง
- การประเมินรายวิชา
- โครงการพัฒนาระบบการเรียนการสอนทางอินเทอร์เน็ต
- เว็บไซต์รายวิชา
- หลักสูตร
- วัติตทัศน์ตามประสงค์
- ข่าว และเหตุการณ์
- ตรวจสอบผลการเรียน

กรุณาให้เหตุผลที่ท่านเลือกเข้าชมส่วนของเว็บไซต์ในอันดับที่ 1 ซึ่งเป็นส่วนที่ท่านเข้าใช้บ่อยที่สุด

ท่านได้ทำแบบสอบถามไป 90 %

ส่วนที่ 4 เกี่ยวกับการใช้ email ของ

1. ท่านเคยใช้ email ของ หรือไม่ ?

ส่วนที่ 4 เกี่ยวกับการใช้ email ของ

1. ท่านเคยใช้ email ของ **■■■■** หรือไม่ ?

- ใช่ (โปรดตอบคำถามในข้อถัดไป)
- ไม่ใช่ (โปรดข้ามไปตอบคำถามในข้อที่ 6)

2. ความถี่ในการเข้ามาเช็ค email ?

- ทุกวัน
- ทุกอาทิตย์
- ทุกเดือน
- ไม่ค่อยจะเช็คนัก

3. ท่านเช็ค email ในช่วงวันหยุดหรือไม่?

- ใช่
- ไม่ใช่

4. โปรดแสดงความคิดเห็นของท่านเกี่ยวกับการใช้ email ของ มศว ตามคำถามข้างล่างนี้ หากท่านพบว่ามิตีคำถามซึ่งท่านเห็นด้วย และไม่เห็นด้วยเหมือนกัน โปรดแสดงเลือกตอบข้อที่ท่านรู้สึกว่าจะเกิดขึ้นบ่อยที่สุด หรือเห็นด้วยมากที่สุด email ของ **■■■■** เป็น

	1	2	3	4	5	
เป็นประโยชน์	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	ไม่เป็นประโยชน์
สับสน	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	ใช้ได้ง่าย
ความจุของตู้จดหมายใหญ่	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	ความจุของตู้จดหมายเล็ก

5. บ่อยครั้งแค่ไหนที่ท่านใช้ email ของ **■■■■** เพื่อประโยชน์ทางการศึกษา ตามวัตถุประสงค์ต่อไปนี้

รายการ	ไม่ เคย							บ่อย มาก
	1	2	3	4	5	6	7	
ส่งการบ้านถึงอาจารย์	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
ส่งรายงานถึงอาจารย์	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	

นัดหมายกับอาจารย์

ขอคำปรึกษาเกี่ยวกับการบ้านกับอาจารย์ของท่าน

ติดต่อกับเพื่อนเพื่อทำรายงานกลุ่ม

ส่งความคิดเห็นถึงผู้บริหารมหาวิทยาลัย

โปรดตอบคำถามข้างล่างนี้เมื่อท่าน **ไม่**เคยใช้ email ของ ■■■

6. เหตุใดท่านจึง **ไม่ใช้** email ของ ■■■ ?

- ไม่เคยทราบมาก่อน
- ไม่รู้สึกสะดวกใจที่จะใช้
- มี email อื่นอยู่แล้ว

อื่น ๆ

7. ท่านมีความคิดเห็นอื่นที่ทางมหาวิทยาลัยสามารถนำไปใช้เป็นประโยชน์เพื่อการปรับปรุงเว็บไซต์?

โปรดแสดงความคิดเห็นที่นี่

ตกลง

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URL: <http://www.■■■.ac.th/survey/>

Information about this document and its content was adapted from

■■■ University website survey and was developed by a [researcher team](#).

Uploaded 20/11/2003 by Poonsri Vate-U-Lan

Edited 20/11/2003 by Poonsri Vate-U-Lan

Authorised 20/11/2003 by ■■■

The English version of the pilot version of web-based questionnaire is following.

University Web Sites Survey

Before completing the survey, please make sure you have spent some time investigating the university web site for information of interest to you or that you would expect to find on the site.

This survey is part of a planned redevelopment of the university web site. It is important that we have feedback on the web site, and how friendly it is to users. Your honest and accurate feedback will help us to meet the needs of university web site users.

If you make a mistake or change your mind on any response, please re-click on the particular item.

Section 1: About participate in on-line questionnaires

1. Why are you responding to this questionnaire?

Note: You can make more than one choice

- Invitation methods
- Interesting topics
- The importance of the survey content
- Because this is a university survey
- Others _____

2. In the future, if you are asked to complete an online questionnaire, what factor which will most influence your decision to participate?

Note: You can make more than one choice

- The significance of the survey content
- The attractiveness of the content
- Time required completing the questionnaire
- The status of organization which is conducting the questionnaire
- Special rewards
- Other

Section 2: About you

Please indicate (you can choose more than one) whether you are:

a current UNIVERSITY student

- Undergraduate Postgraduate

In faculty of

Please select one choice

- Please select one choice
- Humanities
- Science
- Social Science
- Physical Education
- Education
- Nursing
- Medicine
- Engineering
- Fine Arts
- Dentistry
- Pharmacy
- Health Science

a UNIVERSITY staff member

- Academic General

other

a visitor from another institution as a

- Student Academic General

or Parent of Student Government official Business person Not Listed

Section 3: About the university web site

1. How often approximately do you visit the university web site?

- Daily
 Weekly
 Monthly
 Rarely

Please indicate your level of agreement with the following statements about the university web site. If you find there is a question that you both agree and disagree with, please indicate which option you agree with most of the time or most strongly.

	Strongly Agree	Agree	Not Sure	Disagree	Strongly Disagree
2. I always find information relevant to my study	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. It is easy for me to find the information I wanted	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. I find the navigation clear and easy to use.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5. I think the university web site is interesting and not just attractive	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6. I find the information that I want quickly (in a few steps)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7. Information on the university web site is difficult to understand	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
8. I have a good impression of university from its web site	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
9. Finding information on the university web site is difficult	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
10. I always understand what to do or where to go next	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
11. The university web site meets my needs	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
12. I think university has a good university web site	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Answer only if you are a current student.

13. The university web site makes me feel proud to be a UNIVERSITY student.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
14. I can see from the university web site that student life at university is enjoyable.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
15. The university web site encourages me to study at university.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
16. The university web site helps me to study at university.					

Answer only if you are a staff member.

17. The university web site makes me feel proud to be an university staff member.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
---	-----------------------	-----------------------	-----------------------	-----------------------	-----------------------

Answer only if you are a current student.

18. Please rank the following university web site sections from most frequently used to least frequently used

Note: 1 is the most frequently used, 10 is the least frequently used.

- _____ Academic Calendar
- _____ Central Library
- _____ Course Evaluation
- _____ Course Syllabus
- _____ Course Web sites
- _____ Curriculum
- _____ Video on Demand
- _____ email
- _____ News and Events
- _____ Checking grade

Why is your No.1 choice, your most frequently used web site?

Section 4: About using the university email account system

1. Have you ever used the university email account system?

Yes (answer question no.2)

No (go to question no.6)

2. How often do you check your university email?

Daily

Weekly

Monthly

Rarely

3. Do you check your university email during holidays or vacations?

Yes

No

4. Please indicate your level of agreement with the following statements about using the university email account. If you find there is a question that you both agree and disagree with, please indicate which option you agree with most of the time or most strongly.

The university email system is:

	Very Much	Somewhat	Neither	Somewhat	Very Much	
	1	2	3	4	5	
useful	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	useless
complex	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	easy to use
the capacity of the mail box is big	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	the capacity of the mail box is small

5. For your study, how often do you use the university email for the following purposes?

	Never						Very frequently
	1	2	3	4	5	6	7
Send homework or report to teachers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Make an appointment with your teacher	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ask for advice about assignment with your teacher	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Contact your friends	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Answer only if you never use a university email

6. Why are you not using the university email service? You can choose more than one choice

- I have not known about it before.
- I do not feel comfortable using it.
- I have my own email with other accounts.

Other reasons

7. Do you have any comments for improving the university web sites?

Type your comments here.

Some parts of this questionnaire were adapted from the RMIT Web site Survey (2003).

Appendix 7: An Internet-based Survey Form

Address <http://survey.ac.th/web/?id=2> Go Links >>

การสำรวจครั้งนี้เป็นการสอบถามความคิดเห็นเกี่ยวกับเว็บไซต์ และเป็นส่วนหนึ่งของการศึกษาเหตุผลในการตอบแบบสอบถามทางอินเทอร์เน็ต

University
แบบสำรวจความคิดเห็นเกี่ยวกับเว็บไซต์

ขอบคุณครับ

วิธีตอบแบบสำรวจ โปรดคลิกตรงตัวเลือก และพิมพ์ข้อความลงในช่อง

การเปลี่ยนคำตอบ
สำหรับ โปรดคลิกที่ตัวเลือกอื่นในข้อเดียวกัน
สำหรับ คลิกซ้ำที่ตัวเลือกเดิมเพื่อยกเลิก

กรุณาตอบคำถามทุกข้อในส่วนที่ 1

ส่วนที่ 1
การตอบแบบสอบถามทางอินเทอร์เน็ต

1. โปรดจัดอันดับ **เหตุผลหลัก**ที่ทำให้ท่านตัดสินใจตอบแบบสำรวจนี้

หมายเหตุ - อันดับ 1 หมายถึงเหตุผลซึ่งสำคัญมากที่สุด
อันดับ 5 หมายถึงเหตุผลซึ่งสำคัญน้อยที่สุด

วิธีการเชิญชวนให้ตอบแบบสำรวจ
 ความน่าสนใจของหัวข้อแบบสำรวจ
 ความสำคัญของเนื้อหาในแบบสำรวจต่อผู้ตอบ
 เพราะแบบสอบถามเป็นของมหาวิทยาลัย
 รูปแบบดีไซน์ที่น่าสนใจ

อื่น ๆ โปรดระบุ

2. **ในอนาคต** ถ้าหากท่านได้รับการเชิญชวนให้ตอบแบบสำรวจทางอินเทอร์เน็ต ข้อใดเป็นเหตุผลหลักซึ่งทำให้ท่านตัดสินใจ?

หมายเหตุ - ท่านสามารถเลือกตอบได้มากกว่าหนึ่งเหตุผล

วิธีการเชิญชวนให้ตอบแบบสำรวจ
 ความน่าสนใจของหัวข้อแบบสำรวจ
 ความสำคัญของเนื้อหาในแบบสำรวจ
 หน่วยงานที่จัดทำแบบสำรวจ
 รูปแบบดีไซน์ที่น่าสนใจ
 ของรางวัล สมนาคุณ
 เวลาที่ต้องใช้ในการตอบแบบสำรวจ
 ประโยชน์ที่จะเกิดขึ้นต่อผู้ตอบ

อื่น ๆ โปรดระบุ

ส่วนที่ 2
ข้อมูลส่วนบุคคล

เพศ หญิง ชาย

นิสิตใน ในระดับ
ชั้นปี
ในคณะ

บุคลากรใน

ผู้ที่สนใจสมัครเข้าศึกษาในสถาบัน

ศิษย์เก่า

ผู้เยี่ยมชมทั่วไป

ตกลง

Copyright © 2003 _____ University. All rights reserved.
URL: <http://survey.ac.th/web/>
Uploaded January 2004 by _____ webmaster
Created and edited 7 January 2004 by Poonni Vate-U-Lan
Authorised 2004 by _____ Computer Center
[Disclaimer](#)

The English version of an index page of web-based survey is following.

This questionnaire is a survey of your opinion about the university web site and also it is a part of the study of people's participation to the Internet-based survey.

Thai University Web Site Survey

Direction:

Please click on and type in the

Changing the answer

For Please click at another choice in same question

For Please re-click on the particular item

Section 1: About participate in online questionnaires

Please answer every question of section 1

1 Please rank the following reason of your decision to response this survey

Note: 1 means the least significant

5 means the most significant

_____ Invitation methods to response the survey

_____ Interesting survey topics

_____ The importance of the survey content

_____ Because this is a university survey

_____ The interesting survey presentation

Other please specify _____

2. In the future, if you are asked to complete an online questionnaire, what factor which will most influence you decision to participate?

Note: you can make more than one choice

- Invitation methods to response the survey
- Interesting survey topics
- The importance of the survey content
- Because this is a university survey
- The interesting survey presentation
- Special rewards
- Time required completing the questionnaire
- The benefit for respondents
- Other please specify

Section 2 about you

Gender Female

Male

Student at ****

Level: Undergraduate

Master degree students

Doctor degree students

Year: First year
Second year
Third year
Forth year

In faculty of: Humanities
Science
Social Science
Physical Education
Education
Nursing
Medicine
Engineering
Fine Arts
Dentistry
Pharmacy
Health Science

- Staff at **** university
- Prospective students
- Alumni
- Visitors

Submit

แบบสำรวจสำหรับ นักศึกษาใน - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Refresh Home Search Favorites Media History Mail Print Edit

Address http://survey.ac.th/web/survey.asp

การสำรวจครั้งนี้เป็นการสอบถามความคิดเห็นเกี่ยวกับเว็บไซต์ และเป็นส่วนหนึ่งของการศึกษาเพื่อผลในการออกแบบสอบถามทางอินเทอร์เน็ต

University
แบบสำรวจความคิดเห็นเกี่ยวกับเว็บไซต์
 OK
 ขอบคุณครับ

ส่วนที่ 3
เว็บไซต์ของ มศว

1. ท่านเยี่ยมชมเว็บไซต์ของ มศว บ่อยครั้งแค่ไหน?

ทุกวัน
 ทุกสัปดาห์
 ทุกเดือน
 น้อยกว่า เดือนละครั้ง

2. ท่านรู้จักเว็บไซต์ มศว จาก

ลิงค์ของเว็บไซต์อื่น
 Search engine
 เอกสาร เช่น โบปลิ้ว แผ่นพับ วารสาร
 การประชาสัมพันธ์ของมหาวิทยาลัย
 อื่น โปรดระบุ

3. ท่านเคยใช้ Google Search Engine ในเว็บไซต์ มศว ค้นหาข้อมูลในเว็บ มศว ที่หน้า homepage?

เคย
 ไม่เคย

โปรดแสดงความคิดเห็นเกี่ยวกับเว็บไซต์มหาวิทยาลัย

คำถาม	เห็นด้วย	ไม่แน่ใจ	ไม่เห็นด้วย
4. เนื้อหาและภาพที่ปรากฏในเว็บไซต์มีความเหมาะสมกับการเป็นเว็บของสถาบันอุดมศึกษา	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5. ข้อมูลในเว็บไซต์ มศว มีความเป็นปัจจุบัน	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6. เว็บไซต์ มศว จัดได้อย่างเป็นหมวดหมู่อย่างชัดเจน	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7. เมื่อเข้ามาถึงเว็บไซต์ ท่านทราบว่าท่านต้องทำอะไร และจะคลิกไปที่ใดต่อ	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
8. พบข้อมูลที่ต้องการได้ง่ายในเว็บ มศว	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
9. ท่านมีความภูมิใจในเว็บไซด์สถาบัน	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
10. เว็บไซต์ มศว มีส่วนสำคัญในการสนับสนุนด้านการเรียนของท่าน	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
11. ท่านได้รับทราบข้อมูล กิจกรรมต่างๆ จากเว็บไซต์	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

12. กรุณาระบุเว็บเพจที่ท่าน ใช้งานบ่อยที่สุดตามลำดับ

อันดับที่ 1

อันดับที่ 2

อันดับที่ 3

13. หัวข้อใดที่ท่าน**ไม่เคย**เข้าเยี่ยมชมเลย
หมายเหตุ - เลือกได้มากกว่าหนึ่งตัวเลือก

- ปฏิทินการศึกษา (Academic Calendar)
- หลักสูตร (Curriculum)
- เว็บไซต์รายวิชา (ATutor)
- การเรียนการสอนออนไลน์ (SOT)
- โฮมเพจส่วนบุคคล (Personal Homepage)
- ประเมินรายวิชา (ปค.003)
- การสอบ Entrance
- งานรับนิสิตใหม่
- ข่าวประชาสัมพันธ์ (News & Event)
- วีดิทัศน์ตามประสงค์ (VDO on demand)
- คณะ/ภาควิชา/สถาบัน/สำนัก
- บัณฑิตวิทยาลัย (Graduate School)
- งานวิจัย (Research)
- บริการสารสนเทศมหาวิทยาลัย (SUPREME)
- บริการอื่น ๆ (Services)

14. ข้อใดเป็นปัญหาของการใช้เว็บ
หมายเหตุ - เลือกได้มากกว่าหนึ่งตัวเลือก

- ไม่เข้าใจข้อลิ่งค์ที่เป็นภาษาอังกฤษ
- อื่นๆ โปรดระบุ

15. ข้อเสนอแนะเพื่อปรับปรุงเนื้อหาของเว็บไซต์สำหรับ นักศึกษาใน

16. ข้อเสนอแนะเพื่อปรับปรุงการออกแบบของเว็บไซต์สำหรับ นักศึกษาใน

Submit

Thank you for your time
Copyright © 2003 [redacted] University. All rights reserved.
URL: http://survey.[redacted]
Uploaded January 2004 by [redacted] webmaster
Created and edited 7 January 2004 by Poonsri Vate-U-Lan
Authorised 2004 by [redacted] Computer Center
[Disclaimer](#)

Section 3 About ** web site**

3) How often do you visit the **** web site?

- daily
- weekly
- monthly
- less than once per month

4) How do you know **** web site?

- links from other web sites
- search engine
- documents such as leaflet, brochure, magazine
- **** publicity

Other please specify_____

5) Have you ever used the Google search engine on the **** homepage?

- Have used
- Have never used

Please indicate your opinion about the **** Web site

Questions	Agree	Not sure	Disagree
4. the content and graphic used is suitable for a university web site	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5. Information is regularly updated	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6. Navigation guides are clear	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7. when entrance the web site I know what I have to do and what the next links I will click.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

8. it is easy for me to find the information I wanted	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
9. I feel proud of the **** web site	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
10. the web site assists me with my studies at ****	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
11. I receive information of activities from web site	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

12. please rank the following university web site sections which you most frequency used

Number one

Number two

Number three

13. Which pages have you **never** selected?

Note: you can choose more than one choice

- Academic calendar
- Curriculum
- A tutor
- SOT
- Personal Homepage
- Course evaluation
- Entrance
- New student

- News & event
- VDO on demand
- Faculties/ schools/ centres
- Graduate school
- Research office
- SUPREME

14. What are the problems of using **** web site?

- Not understand the English links


Other please specify_____

15. Could you comment on how to improve the content of this web site from students' point of view?

16. Could you comment on how to improve the design of this web site from students' point of view?

Appendix 8: Results of Web Accessibility Checking


Address <http://webxact2.watchfire.com/report.asp?t=2> Go




Check another page:
 Go!
[Show Advanced / Accessibility Options](#) | [Terms of use](#)


Results for <http://survey.█?id=1>
 Page last checked on Mon 02/02/2004 at 7:01 am.

General Quality Accessibility Privacy [Expand All](#) | [Collapse All](#)

 This page **complies** with all of the automatic checkpoints of the W3C Web Content Accessibility Guidelines. However, it **does not comply** with all of the manual checkpoints, and **requires manual verification**.

	Automatic Checkpoints			Manual Checkpoints		
	Status	Errors	Instances	Status	Warnings	Instances
Priority 1	✓	0	0		11	46


Priority 1 Checkpoints [Collapse Section](#) | [Top of](#)

 **Warnings**
 11 tests, 46 instances on page


[Expand Code Fragments](#)

Guideline	Instances	Line Numbers
1.1 If an image conveys important information beyond what is in its alternative text, provide an extended description .	5	204, 205, 210, 231, 325
2.1 If you use color to convey information, make sure the information is also represented another way .	18	204, 205, 210, 219, 231, 233, 237, 240, 240, 241, 241, 296, 296, 296, 325, 342, 400, 408
4.1 Identify any changes in the document's language .		
5.1 If this is a data table (not used for layout only), identify headers for the table rows and columns .	4	207, 392, 412, 428
5.2 If a table has two or more rows or columns that serve as headers, use structural markup to identify their heirarchy and relationship .	8	207, 244, 296, 321, 339, 392, 412, 428
6.3 Provide alternative content for each SCRIPT that conveys information or functionality .		
6.3 Make sure pages are still usable if programmatic objects do not function.	3	8, 92, 173
7.1 Make sure that the page does not cause the screen to flicker rapidly .		
8.1 Provide accessible alternatives to the information in scripts, applets, or objects.	3	8, 92, 173
11.4 If you can't make a page accessible, construct an alternate accessible version .		
14.1 Use the simplest and most straightforward language that is possible.		

Custom Accessibility Standards

 Watchfire WebXM and WebQA can identify pages that do not meet custom accessibility standards ([learn more](#))


Page Links

Links in:
 To help in site maintenance, Watchfire WebXM and WebQA can identify all of the pages that link to this page ([learn more](#))

Links out: 8

Now that you've tried **WebXACT** on a page, find out how Watchfire can help your entire site!

To learn more, choose a product:



Appendix 9: Observations Script

Note: All the observations were conducted in Thai and translated into English by the researcher.

Participants from the Education Faculty

A male third-year university student

I feel like this questionnaire is...., I am not sure about it. Also I worry that perhaps I do not understand this questionnaire. Thus, I might not give a clear answer about how I feel about this questionnaire. I think, the language used in this form is.... too long. Whenever it is long, this can cause people to not want to read it. It needs to be a short question which is easy to understand and grasp the concept.

The text size is... I am not sure, but it looks fine for me to read and for persuading other users to respond to the questionnaire. About the appearance of the form, perhaps the white space, it might..., if the white space is too wide, perhaps it causes users who wish to participate do not feel the need to respond to the form. The too wide white space makes users bored and they do not want to participate in the questionnaire. The white space should not be so much. About questions, I think if questions are simple, I mean the question that asks straight forward to the point; if questions cause confusion, they can make users not want to respond anymore. Well.... it is the way to assist people to participate precisely. That is, giving clear directions at the beginning. The directions need to be explained clearly and accurately and also the language used in questions should be clear, direct, no confusion, go to the point straightaway to help people decide faster and with more accuracy. There needs to be directions at the start of the questionnaire.

Well, I think in order to respond to any survey, if I do not see through all the form I can not say agree or disagree to participate. Whenever I have looked through all items, I feel more confident in terms of how many items I can answer or.... At the first glance, I think this will be a hard activity. In order to respond to this questionnaire, the language of questions needs to be not confused, easy to understand. The text size seems all right to me even though the font style is too formal. The progressing bar indicates how many per cent of the questionnaire has already been

filled in and keeps telling you at every section of questionnaire and so will inform the users about the process of working. The presenting of the working process is important. For the third section, it is the main topic. The first section is the question about how to get into this form that is good to check about who are users and how many of them. If there are only a small number of participants but they give only positive attitudes, it means the web site of the university is effective. For the next question, it is the dichotomous type; this kind of question is good due to its clarity. This makes users feel it is 'not too difficult'; these options help users answer more quickly. And also the next question is 'if you are a *** student'... it emphasises me, only people who are in *** can answer these questions, people who are not in *** can pass these questions. The specific question such as 'only users who are studying in university' is better than no specific question. My conclusion is the question, the questions used in the form are supposed to be easy and possible to answer. From the start until now, I can say that to the easy questions I can respond quicker. The question that needs to be answered by explanation requires users think about it longer. Well... for this question 'The *** web site meets my needs' - this is asking directly about people's opinion, it is not very complex, I am not made to feel awkward in responding and can choose any items immediately. Then 'I can see from the **** web site that student life at **** is enjoyable.' This also is asking about the fact that users can decide to answer suddenly as well. 'Rank the following university web site sections' is a question that makes me a little confused because someone will not be good at.. and also confused about the number. Well this might allow someone to choose only the web page that people would like to visit. The participants perhaps click on the item. If the users feel confused about the number, what is the most important, then what is the second important, they might leave all of them blank.

“About the fourth section, 'about using the university email account system', this is easy and not complex. Frequency of checking one's email also is a question that everyone can answer but the last item 'rarely'. Well... perhaps, someone has checked, not frequently but the word 'rarely' might lead to a different meaning. Someone checks it twice a week, ten times in a month; I mean this condition seems too broad. It should specify more; it should be written down indicating how many times the email has been checked. In order to answer 'Frequency of checking email', it may be better to let users type in the number of times instead of choosing from the choice given.

What does the last choice 'rarely' mean? Everyone's understanding is not the same. Some difficult questions will require a longer time to think about and this may make users leave the Internet-based survey."

About the question number three ... 'Do you check your email at the weekend?' Then choose 'yes' or 'no', well, this is a good question that is understandable and easy to choose. The yes-no questions are appropriate for use in the web-based survey.

About using the university email account system, as I look through this section, someone who does not understand or can not understand will be confused because useful is on the left and useless is on the right. But if users have experience of doing a similar examination, they might not be confused. This kind of question might cause users who see it the first time to leave it blank and misunderstand it and also not want to participate; messages such as 'the capacity of the mail box is big' 'the capacity of the mail box is small' also might make some people confused. What does 'big' mean?"

When the question asks 'Send homework or report to teachers', this seems to be a clear question and provides a clear label of choices. About 'why are you not using the university email service?' ... this also is clear and offers an 'other reason' option that users can use to express their opinion in their own words. The 'other' option allows users to express their opinion in their own words - this is a good style of questioning because a participant might have an interesting idea to improve the university web site.

A female third-year university student

I feel like there are too many texts; if I am going on the Internet and see a web page that includes lots of text like this I might not read it. It has only text, text and text, too many letters. The survey was not decorated with images; this made it lack interest. I did not see any images on this form. The white space is sound, OK, it is clear. The language is understandable. Dividing between directions and questions is good enough. The space is appropriate. I suppose that others might feel the same. I feel a bit confused on the direction that explains how to change answer, what does it mean? confused, confused. I participated because this form belongs to a university. In the

five rating scale the word 'not sure' means agree or disagree, I feel strange about the label of each option in these questions.

The sixth item 'I find the information that I want quickly (in a few steps)' the words in brackets, ... perhaps it is not necessary to state 'in a few steps'."

The seventh item 'Information on the **** web site is difficult to understand' ...does this mean the navigation is difficult or the content is difficult? The language used in questionnaire affects the time required to complete the form.

The ninth question 'Finding information on the **** web site is difficult'. I feel the language is very strange.

The tenth question, also difficult to understand, the language is very strange. This mouse is not good; if I am working on a computer with a poor mouse like this and there is a requirement to fill the online form, I will leave.

The survey should ask the gender of respondent.

I feel confused about the directions that try to explain how to change the choice.

The main reason is time required to complete the form and who conducts the survey.

I like the graphic that represents the process of working.

It is quite confusing on the choice "not sure" in the Likert five-scale question.

I do not understand the question, number seven. About university's web site, I think other universities' web sites provide more interesting information on their web sites. They include more interesting activity. **** web site rarely update their information. It is good that the survey provide a progressing bar to indicate how many percentage has been filled out. Wow, I have nearly finished this form.

The university's web site should update their information more frequently. The number of computers used for to service students is too small. One needs to wait for in a queue quite long, nearly an hour for using the computer for only two hours. Students did not get any benefit from the Internet from using computer in the computer centre at university.

Then the directions in each section, some direction is too long. If you want participants to answer quicker, the language used in the question needs to be easy and understandable. In the five-point rating scale the word 'not sure' means neither agree nor disagree, I feel strange about the labelling of each option in these questions. If it needs an accurate answer, it needs to provide accurate choices; labels such as 'not sure' made me confused about the meaning. The misunderstandings in the survey were only wording, not navigation. Also the misunderstanding happened when I was asked about something that I have no experience about. For example 'about using the university email account system', I've never used university email so I do not understand enough to be able to answer this section.

Participants from the Fine Arts Faculty

A male third-year university student

The form needs to be decorated with animations. It needs to attract users more than this. The appearance of this form does not motivate or encourage users to respond. Whenever a cursor moves to every option, it needs to have a tool tip text to explain what that option means. I also am confused on the directions that explain how to change choices. Basically, I know how to answer and choose any options on the on-line form but after reading the direction, I feel confused. It is not necessary to explain. I think this form will be more interesting and encourage users especially teenagers with colourful and more technological techniques. It will be good, if you use an advertising style that can grasp people's attention to look at something. Perhaps this needs to create a story that has actors or actresses point and explain how important the survey is. If the questionnaire can be presented by a welcoming voice and sound effects when items are clicked on, this would be fabulous.

A female third-year university student

The form needs more colour in terms of decoration if you need teenagers like third year students to participate. The white and grey background is too simple. There is no image on this form. Where is the image? ... The form needs more colour in terms of decoration if you need teenagers like third year students participate. The form will be more interesting if presented by some characters or cartoon, yes, use cartoons to reduce the too formal style of the university's web site. Also it should use informal font rather than the standard font. I will respond to the survey whenever the content of the survey is useful to me.

I know nothing about the content of the survey.

Participants from the Humanities Faculty

A male third-year university student

Ur, from what I have seen, the font size is OK. I can say that the overall view of this questionnaire is friendly, because it looks similar to the university's web sites. The length of the questionnaire, I feel that it is not too long. After I tried it out, I did not feel stressed to complete the form even though the font size is small, but it depends on the setting of the screen resolution. About white space and text, it seems OK to me. The step of filling in the form is quite simple and easy for me, only check and check and type in the input. I prefer to complete the Internet-based survey rather than a paper-based survey. The direction is not necessary to keep explaining all the time because all are using similar processes. The directions are not necessary to be kept explaining all the time because all use similar processes. The directions may be useful for people who do not have computer literacy and perhaps it will give clear directions for everyone. How to respond to the form quicker? Questionnaires that provide all possible options are better than that those requiring all input text for every question. What have been missing in this form? Providing a 'help' section perhaps is useful to users who have poor computer literacy. The indicator revealing the percentage of completing is not necessary because users are going on to answer all questions. This form is quite long; I worry that it takes time to download. Perhaps, I will close a window before getting all the data. I do not want to waste my time to wait for it. The university's web sites corrupt very often. The help section perhaps is useful only for users who rarely use computers. The overall view of this questionnaire is quite good. It might not take a long time to answer each question. I would like to suggest that I worry that the form will take quite a long time to download. If it loads in slow speed, it will be closed before I see any information. I worry about this issue rather than the design. Also as I stated before, the university's web site corrupts very often; for example, whenever students need to check their grade, it will corrupt. If I access from my home perhaps it will be OK. Well, if it still needs to wait, this will waste my time.

The university web site corrupts very often.

A female third-year university student

It belongs to the university. I will participate in it, this is the only reason. In the future, if I am invited to response to a questionnaire, the organization impacts on the decision as well. Next, asking about demographic detail, studying in **** undergraduate Humanity Faculty, how often visiting university web sites. Well, I visit only when necessary in checking grades, evaluating teaching. Please indicate your opinion; this is only after exploring some parts of web sites. During this period, the university's web sites provide only useful information academically. The university's web sites look very formal. The students who study from the first year until the fourth year are teenagers. Usually, the university's web sites corrupt quite often. Finding information easily, well this should change to find all needed information. The next question asking about opinions on **** web site, is it interesting more than beautiful? However, it needs to have animations. Each section of web sites looks interesting. I can reach information quickly, click through the library web site or having problems. I would like it has more motivation to use the web site. One issue is there is no promotion of the university web site. Do students know the survey is being provided on the web? This should have the activity as a competition and persuade students to answer on the web. The promotion should be provide at the canteen because it is crowded with students. Also it should provide a chat room on the web. I can find information quickly, this is a bit not clear. Usually, if not relevant to work, I will not access university web site. 'The **** web site makes me feel proud to be a **** student.' 'I can see from the **** web site that student life at **** is enjoyable.' The language used in the survey affects the way of response to the survey. It needs to be short and have meaningful wording. Each item needs to be different. There are some questions that ask the same question but use different wording.

I need to understand the questionnaire quickly. This questionnaire is quite well organized; however, it lacks anything that motivates me to respond. It needs to encourage respondents to have to complete the form. The University's web site looks too formal. The university web site should have more flexibility and respond to the demands of students rather than present itself academically.

Participants from the Sciences Faculty

A male third-year university student

Would you like me to start talking? Normally, I never talk what I am thinking, it is unusual. Don't you need me to fill the form right now? Each section should use a different background colour. The title should be bigger than it is. This form might be too long. It should provide a gift such as the Internet package after completing the form. The topic seemed to be a bit difficult. Looking at the topic makes it difficult to group the questions. I feel more confused. I think... well... I think the survey should be... OK... let's stimulate that when I click the area of that particular items change to other colours. This will support clearer presentation of each item. Also it needs a beautiful background. This questionnaire looks like text on plain paper or formal report paper. Changing to a beautiful form with decoration would also make it look friendlier. It should say 'Thank you for your time' at the bottom line. It should provide links to other web sites. Providing links to other web sites can make this form more interesting. It might link to search engines or email and so on. This page does not have links to others, the links can increase the interest. Is there only one web page? The links perhaps are not necessary to be relevant to the form. The interesting web sites of third year students like me are download, especially software. To rank something in order, it is difficult, I am confused. Ur, I have no idea anymore. I have no idea anymore, I think I have repeated what I thought several times.

A female third-year university student

I think colours of this Internet-based questionnaire are too pale and also it presents only text and text. There is no interesting response and technique. It might include some images for decoration. It looks empty as I see only text. Well incentives.. I think access to the university's networks is difficult. I should respond, I think I will response because the officers and lecturers will take this result to improve and develop the university's web sites. To respond on any survey, it depends on the topic of the survey, its content. If it is an interest of mine, I will respond.

Appendix 10: Focus Group Interview Script

Note: All the interviews were conducted in Thai and translated into English by the researcher.

Focus group interview of nine students from the Humanities Faculty

Researcher: I am going to ask you about the way that you participate in a web-based survey. Let's start with the first step 'getting entry to the Internet-based survey'. Which invitation are you going to choose to enter the survey from university's homepage? Why would you choose it? (also show images of different invitation on the screen)

(after introducing myself and my research)

- an advertising marquee as big as banner size
- a pop-up window when a user enters the website
- a message box when a user clicks on any links on the homepage

An interviewee: I will choose to enter the survey from a pop-up window when the user enters the web site because it looks more interesting and it only has a 'start' button. Additionally, it is decorated with a cartoon that makes it more relaxed.

An interviewee: I won't choose [*the pop-up window*] because the pop-up window seems imposing when I am using the Internet.

An interviewee: I will choose to get into a survey from a message box when a user clicks on any links on the homepage because it seems to be quite important information. Also, the web site tries to persuade me to do it.

An interviewee: Everyone sees a message box.

An interviewee: I have a different idea. I perhaps would choose an advertising marquee because it directly informs someone who would like to do a survey. Moreover, this seems to be the easiest way; just one click away. The pop-up window distracts someone; some people do not

like it. Therefore, the direct way is better.

An interviewee: It is easy and not complex for general users who do not have to know much technology. They can participate in the survey suddenly.

An interviewee: Hang on, I think the advertising marquee has a barrier. General users might not see an advertising marquee clearly because the entire message is looping.

Researcher: It is good that you are expressing your opinion. Well... let's move to the next question. Is the web site logo important for obtaining responses to?

An interviewee: Yes, it is. It is better to have the logo of the university to give more confidence to users in terms of responding to the survey.

Researchers: Is there anyone have different opinion from this and can tell me why? If not, I would like to ask you Is a help section necessary for completing the online questionnaires?

An interviewee: Yes, it is. I think it should have [a help section]. It will be better for a newby.

An interviewee: But I think, it is easy to understand how to complete the form so it is not necessary to provide the help section.

Researcher: Should the demographic info section be obtained before or after completing the questionnaire?

An interviewee: I think it should be obtained before completing it because generally, I have seen it be obtained before the main part of the survey. Normally, it is a section before the questionnaire and also it should not take too long.

An interviewee: I think it should be obtained 'after', because sometimes it makes people too tired to complete questionnaires if it is at the start.

Researcher: OK. Let's move to the next question. Are you likely to close the window when the survey asks you to complete your email addresses?

An interviewee: No, I am not. Whenever it belongs to my university, I will give my email address. However, when the survey belongs to commercial web sites I won't give it because I do not want to have a spam email.

Researcher: Are you likely to close the window when the survey asks you to complete your ID numbers?

An interviewee: Yes, I am. Because it sounds too personal question.

An interviewee: No, I am not. I will fill it in when it belongs to the university or other interesting organizations.

Researcher: It is good that you're expressing your different opinions. There is no right and wrong about what you are going to do. Then I would like to ask you about which of the following is the most preferred online questionnaire format. There are two main types of online questionnaire formats. The first type is scrolling page that include all questions in one page (also see an example on the screen). The second type is one or a few items per page which usually do not require users to scroll down in order to respond to the next question but the users need to click on a next button instead (also see an example on the screen).

An interviewee: Scrolling pages... I think, it does not look complex. I can continually complete it. I don't want to have too many clicks.

An interviewee: I think the one item per page.... Because it seems to use less time for downloading and also it does not look like a hard work.

Researcher: Let's look at the detail of the survey elements. Is the status bar valuable in terms of knowing what per cent of the questionnaires is completed?

An interviewee: Yes, it is. If the form includes the status bar, the users will know the progress of their work.

An interviewee: No, it is not. It does not matter... even more or less the percentage of completion, if I decide to participate.

Researcher: I would like to know. What is the approximate number of items to facilitate completion?

An interviewee: For me, I think around 11-15 items.

More than half of participants Around 16-20 items.

An interviewee: I can complete the survey if there are around 30 or 50 items.

Researcher: What is the maximum time that you are willing to spend to complete an online survey?

An interviewee: Around five minutes.

An interviewee: Perhaps around ten minutes.

More than half of participants It should not longer than 20 minutes.

Researcher: If the survey requires completing an item that you have forgotten to respond to, what are you going to do?

An interviewee: If the topic of the survey is interesting and relevant to me, I will answer it.

Researcher: Now, I have asked all questions about elements of Internet-based questionnaires. In the next section I am going to ask you about the icons used for items on web-based surveys. The first icon is a 'check box'. (also the researcher points to the check box on the screen) Do

you know how to interact with this icon?

All the interviewees nodded their heads. Some said no problem.

Researcher: The second icon is an 'option button'. (also the researcher points to the option button on the screen) Do you know how to interact with this icon?

All the interviewees nodded their heads. Some said no problem.

Researcher: The third icon is a 'drop-down menu'. (also the researcher points to the drop-down menu on the screen) Do you know how to interact with this icon?

All the interviewees nodded their heads.

Researcher: Could you please tell me how to respond this icon?

An interviewee: Click on the triangle at the end of the box; then choose an option that you need.

Researcher: Okay, I am going to ask you about your opinion about participating in different types of questions in the survey. I will show you the question then please indicate your response. Are there any problems, and what are the problems and what is the solution for the particular kinds of questions? Let's start with the dichotomous questions.

An interviewee: This kind of question is simple to understand and it seems very easy to choose only one choice.

An interviewee: There is one problem, that is, the answer option does not cover all possible answers. It should have more options.

Researcher: About 'Filter questions or contingency questions'... as you have seen, this question offers two choices, if you decide to choose the second choice that requires you skip to the sixth question. Is there any problem responding to this kind of question?

- An interviewee: I can say that it can make participants confuse to 'go to other questions'. I might forget to skip. I prefer the questionnaire provide a skip function.
- Researcher: OK, if this questionnaire has an automatic function to assist you to skip those particular questions. What do you think?
- An interviewee: That is better. I prefer the questionnaire to provide a skip function.
- Researcher: How about this 'rating question'? The five-scale rating.
- An interviewee: I do not like this kind of question because it will take a longer time to decide. I do not like five point scales and they also are confused about the meaning of the labels. What is the difference between 'agree' and 'strongly agree', 'strongly disagree' and 'disagree'? What a measurement system is of agrees or disagrees?
- Researcher: OK, how about the matrix questions? (These are seven scales rating asking the frequency of different activities on the Internet. The left size is 'Never' with number 1 and the right size is 'Very frequently' with number 7.)
- An interviewee: That is causing more trouble. This is more complex than the five-point scale rating. The difficulty is degree of each option, what exactly it means.
- Researcher: How about 'the multiple option questions'?
- An interviewee: They are okay. I know that I can choose all that apply.
- Researcher: How about 'the ordinal questions'? (these questions provide nine options)
- Most interviewees: I don't like them. They take time to think and rethink.
- An interviewee: It is not a big problem at all; well... however, I can say that sometimes I do not understand some options that have been provided.

So I just do it without care.

Researcher: How about 'the open-ended questions'?

An interviewee: They are okay.

Researcher: Usually, do you answer the open-ended questions?

An interviewee: Well... if I am interested in the topic of the questionnaires, then I will complete them.

Researcher: Okay, one more question about types of survey questions. How about the single choice questions?

All interviewees: They are no problem with the single choice questions.

Researcher: Now, I have asked all the questions. Is there any thing you would like to express your opinion on about the design of the on-line questionnaire?

Thank you for your time.

Focus group interview of ten students from the Social Sciences Faculty

Researcher: I am going to ask you about the way that you participate in a web-based survey. Let's start with the first step 'getting entry to the Internet-based survey'. Which invitation are you going to choose to enter the survey from university's homepage? Why would you choose it? (also show images of different invitation on the screen)

(after introducing myself and my research)

- a pop-up window when a user enters the web site
- an advertising marquee as big as banner size
- a message box when a user clicks on any links on the homepage

An interviewee: I will choose to entrance the survey from [*a pop-up window*] with images because these persuade me to respond to the survey at the initial web site because the graphics on the window make it looks more interesting, beautiful... also, more outstanding than the other methods. Also, it is more beautiful than others.

An interviewee: I won't choose [*a pop-up window*] because usually I close a pop-up window before it completely downloads, so, perhaps I would not know there is an invitation to participate in the survey. I do need to get information on the web site, not on the pop-up window.

An interviewee: I think most users can not see the advertising marquee clearly especially on the university's homepage. This is because the colour of text looks similar other texts on the homepage, may be many users will not notice it.

An interviewee: I will choose an advertising marquee because this is my real purpose to fill the questionnaire.

Researcher: Is there anyone who would choose when a user clicks on any links on the homepage? (no one choose this method)

Researcher: It is good that you are expressing your opinion. Well... let's move to the next question. Is the web site logo important for obtaining

responses to online questionnaires?

An interviewee: Yes, it is. It is a symbol of guarantee from the trusted organization. Also it makes for more accurate user response. The users will have more confidence to participate in the survey.

Researcher: If it does not belong to the university, it belongs to another organization or business company. Is the web site logo important on obtaining responses to the online questionnaires?

An interviewee: Yes, it is. The logo of company or web site should be on the survey page.

Researchers: Is there anyone have different opinion from this and can tell me why? If not, I would like to ask you “Is a help section necessary for completing the online questionnaires?”

An interviewee: Yes, it is. It should have the help section for other users to understand the same meaning of the directions.

An interviewee: Well, I have a different idea. To complete the web-based survey, it is a quite common activity for computer users so it does not a matter whether one provides a help section.

Researcher: Should the demographic info section be obtained before or after completing the questionnaire?

An interviewee: It should be provided before completing the questionnaire because this section will prove whether or not the visitors are members of the target population.

An interviewee: Basically, as I have seen at the end of other questionnaires, they provided for only unimportant question or open-ended questions. It also seems like the survey categorizes respondents.

An interviewee: If the survey requires too many details, I would like to leave the questionnaire at the start.

Researcher: What do you mean ‘too many details’? Could you please explain more to me?

An interviewee: I mean the demographic info section require too many details, and also the questionnaires that include too many questions.

Researcher: OK. Let’s move to the next question. Are you likely to close the window when the survey asks you to complete your email addresses? This is not asking your email address for any rewards or incentives.

An interviewee: (Most of interviewees do not likely to give their email address.) I do not want to give my email address. Perhaps, they will send unwanted email to me.

An interviewee: It is possible to use my email for the other purposes.

An interviewee: No, I am not. It is all right if it belongs to the university. My worry is only the web sites that perhaps will take my email address for commercial use.”

Researcher: Are you likely to close the window when the survey asks you to complete your ID numbers?

An interviewee: No, I am not... but I will only leave it blank because it seems too personal. And also, it depends on the topic.

An interviewee: No, I am not going to close the window, and I will give my ID because it belongs to my university.

An interviewee: I still not sure to give the ID number neither nor leave it blank. I do need to consider about the topic of survey.

Researcher: Well, if the survey of university requires your ID number in order to get your information like gender, faculty and level instead of completing the demographic section. What do you think?

Most of the interviewees nodded their heads.

Researcher: Aren't you likely to give it?

An interviewee: No, I'm not. Perhaps, give the false one.

Researcher: It is good that you're expressing your different opinions. There is no right and wrong about what you are going to do. Then, I would like to ask you which of the following is the most preferred online questionnaire format? There are two main types of online questionnaire formats. The first type is the scrolling page that includes all questions on one page (also see an example on the screen). The second type is one or a few items per page which usually does not require users to scroll down in order to respond to the next question but the users need to click on a next button instead (also see an example on the screen). So, the question is which format of survey do you prefer?

An interviewee: I prefer the first format.

Researcher: What is your reason?

An interviewee: Because it suppose to be quicker than the second one. Some computers take time to download the next page. I prefer the scrolling pages because it may use less clicks. Also, it seems like take time to download only once. (there were no students who choose the one item per page option)

An interviewee: The scrolling should download quicker.

An interviewee: For the second type, one item per page I do not know the length of all questionnaires in total. Perhaps, I will close the next page when it is slow to download.

Researcher: Let's look at the detail of the survey elements. Is the status bar valuable in terms of knowing what % of the questionnaires has been completed?

- An interviewee: Yes, it is. It is good to know the progress of working status. It seems like it motivates users to keep going, like... no more left then keep working.
- An interviewee: No, it is not. The status bar is not necessary; sometimes it makes me feel tired at the start because it is a long way to go. I know by looking at the scrolling bar position. If the scrolling bar is at the top, it means it has just started. If the scrolling bar is nearly at the end of the screen, it means it is close to finish.
- Researcher: I would like to know. What is the approximate number of items to facilitate completion?
- Four interviewee: I suggest that for Internet-based surveys that I prefer to complete should have about 15 items or perhaps only 10 items. (Other three students nodded their head which mean agreed with this answer.)
- Four interviewee: I think around 16-20 items. (Other three students nodded their head which mean agreed with this answer.)
- Two interviewee: I can complete the survey that is not over than 30 items. (One student said and another one agreed)
- Researcher: What is the maximum amount of time that you are willing to spend to complete an online survey?
- An interviewee: Around ten minutes. (One student said and others agreed with him)
- Researcher: Is that a maximum?
- An interviewee: Yes, it is. I can say around five minutes.
- Researcher: When you said ten minutes, does that include downloading time?
- An interviewee: No, it does not include downloading.
- Researcher: If the survey requires completing an item that you have forgotten to

respond to, what are you going to do?

An interviewee: Well... if it is a difficult question, I perhaps will decide to close the window. If it is not too difficult I will return to complete that particular item. In the other situation, if I have nearly finished answering; I will go back and complete it.

Researcher: Now, I have asked all questions about elements of Internet-based questionnaires. In the next section I am going to ask you about the icons used for items on web-based surveys. The first icon is a 'check box'. (also the researcher points to the check box on the screen) Do you know how to interact with this icon?

Most interviewees nodded their heads. Some said no problem.

Researcher: The second icon is an 'option button'. (also the researcher points to the option button on the screen) Do you know how to interact with this icon?

All the interviewees nodded their heads. Some said no problem.

Researcher: The third icon is a 'drop-down menu'. (also the researcher points to the drop-down menu on the screen) Do you know how to interact with this icon?

All the interviewees nodded their heads.

Researcher: I am going to ask you about your opinion about participating in different types of questions in the survey. I will show you the question then please indicate your response. Are there any problems, and what are the problems and what is the solution for the particular kinds of questions? Let's start with the dichotomous questions. This is a question that offers two options, yes and no. Is there any trouble using this type of question?

An interviewee: Yes, it is. It is confusing because of the short form of the answer

choice.

Researcher: Please explain this more to me.

An interviewee: I think, the language used in the answer choices make me confused because it is a short form and presents only “yes” and “no”. Also, because of the question ending with or not so the answer will have the opposite meaning. I mean, the answer ‘yes’ means ‘No, I never’ and ‘no’ means ‘Yes, I have’. I think it is necessary to use the full form of answering rather than the short form.

An interviewee: I think so; it will be better when using the full sentence for answering and to ignore ‘yes-no’ at the start. Whenever the meaning is clear, the ‘yes-no’ question will be not problem any more.

Researcher: Good to know your understanding about the wording of questions and answer options. Okay, how about ‘Filter questions or contingency questions’ ... as you have seen, this question offer two choices, if you decide to choose the second choice that requires you skip to the sixth question. Is there any problem responding to this kind of question?

An interviewee: No, there is not a problem if the program generates the option for me. I think the technology can easily assist this.

Researcher: How about this ‘rating question’? The five-scale rating.

An interviewee: This gives me a hard time when making a decision.

Researcher: What do your feel about this kind of question? Confused? Takes time to think?

An interviewee: It takes time for me to think which one is agree or disagree.

An interviewee: I have to think about how many per cent agree or disagree. It is difficult to decide.

An interviewee: What is difference between “Strongly agree” and “Agree”? I did not see the diversity between “Strongly agree” and “Agree”.

Researcher: Anyone else?

An interviewee: Usually, I might choose only neutral rather than what I really think. Exceptionally, I really agree or disagree in that particular question. It should have only two sizes – black and white. I can not be sure that the degree of difference between “Strongly agree” and “Agree” is the same as the difference between “Agree” and “Neutral”. The label is very important also.

Researcher: OK, how about the matrix questions.

An interviewee: This is difficult to decide. I am likely to leave it blank. Especially, the question asking about frequency, I can not understand clearly about the different meaning of each level from one to seven. It will be better to classify the meaning of frequency on each label.

Researcher: How about ‘the multiple option questions’?

An interviewee: They are okay. They are easy to answer.

Researcher: How about ‘the ordinal questions’? (these questions provide nine options)

Most interviewees: No, they are not a problem respond to ordinal question but it should not provide too long lists. It is difficult to read and remember them, and then order them.

An interviewee: The other problem is, I might have two items in the same order.

Researcher: Well, I would like to know that during completing the survey and it reveal question that you think that is quite difficult to answer. What is you likely to do? Do you decide to quit or what else? Tell me, just tell me, I have no business about this. I just would like to know.

An interviewee: If I have filled it more than half, I will continue work on it.

Researcher: How about 'the open-ended questions'?

An interviewee: Actually, I do not like to answer 'the open-ended questions'.

Researcher: Okay, one more question about types of survey question. How about the single choice questions?

All interviewees: They are fine, no problem.

Researcher: Now, I have asked all the questions. Is there any thing you would like to express your opinion on about the design of the on-line questionnaire?

Thank you for your time.

Focus group interview of three students from the Education Faculty

Researcher: I am going to ask you about the way that you participate in a web-based survey. Let's start with the first step 'getting entry to the Internet-based survey'. Which invitation are you going to choose to enter the survey from university's homepage? Why would you choose it? (also show images of different invitation on the screen)

(after introducing myself and my research)

- a message box when a user clicks on any links on the homepage
- a pop-up window when a user enters the web site
- an advertising marquee as big as banner size

All interviewees: I prefer a pop-up window with a cartoon. This becomes interesting because of the colour of the graphic. If the invitation has only text, it will not work.

Researcher: It is good that you are expressing your opinion. Well... let's move to the next question. Is the web site logo important for obtaining responses to online questionnaire?

An interviewee: Yes, it is.

The participants need to know which organization is providing the questionnaire. The logo of web sites makes them have more confidence.

Researchers: Is there anyone have different opinion from this and can tell me why? If not, I would like to ask you that... Is a help section necessary for completing the online questionnaires?

An interviewee: Well ... Perhaps, the survey should have a help section when it requires a specific method for completion.

Researcher: Should a demographic info section be obtained before or after completing the questionnaire?

- An interviewee: I think it should be obtained 'before' completing because someone might leave it blank when it is obtained after.
- An interviewee: I think it should be obtained 'after' because the most important thing is the questionnaire not the demographic. Also, sometimes when the survey asks about demographic details before, can make respondents quit the survey because they do not want to give the information. But people who have nearly finished completing the survey and then see demographic section at the end, they might not leave the survey.
- Researcher: Quite interesting, OK. Let's move to the next question. Are you likely to close the window when the survey asks you to complete your email addresses?
- An interviewee: No, I am not. It does not a matter; I do not worry about it. It is only email address.
- Researcher: Are you likely to close the window when the survey asks you to complete your ID numbers?
- An interviewee: No, I am not but I will leave it blank. I do not fill it in because it seems too personal.
- Researcher: It is good that you're expressing your different opinions. There is no right and wrong about what you are going to do. Then I would like to ask you about which of the following is the most preferred online questionnaire format. There are two main types of online questionnaire formats. The first type is scrolling page that include all questions in one page (also see an example on the screen). The second type is one or a few items per page which usually do not require users to scroll down in order to respond to the next question but the users need to click on a next button instead (also see an example on the screen).
- All interviewee: I think I prefer the scrollable pages because it uses less clicks. I love to see all the items in on one page. I do not like to wait for the next

page.

Researcher: Let's look at the detail of the survey elements. Is the status bar valuable in terms of knowing what per cent of the questionnaires is completed?

An interviewee: Yes, it is.

Researcher: I would like to know. What is the approximate number of items to facilitate completion?

An interviewee: Depending on topics, if it is fun, it does not matter. Well, for the approximate number, I can say less than 20 items, it should be fine. However, if the topic is in my interests, a long questionnaire is all right.

Researcher: What is the maximum time that you are willing to spend to complete an online survey?

An interviewee: Not longer than five minutes.

Researcher: If the survey requires completing an item that you have forgotten to respond to, what are you going to do?

An interviewee: I will return to complete the survey.

Researcher: Now, I have asked all questions about elements of Internet-based questionnaires. In the next section I am going to ask you about the icons used for items on web-based surveys. The first icon is a 'check box'. (also the researcher points to the check box on the screen) Do you know how to interact with this icon?

All the interviewees nodded their heads. Some said no problem.

Researcher: The second icon is an 'option button'. (also the researcher points to the option button on the screen) Do you know how to interact with this icon?

All the interviewees nodded their heads. Some said no problem.

Researcher: The third icon is a 'drop-down menu'. (also the researcher points to the drop-down menu on the screen) Do you know how to interact with this icon?

All the interviewees nodded their heads.

Researcher: Okay, I am going to ask you about your opinion about participating in different types of questions in the survey. I will show you the question then please indicate. Are there any problems, and what are the problems and what is the solution for the particular kinds of questions? Let's start with the dichotomous questions.

An interviewee: There is not a problem whenever the question includes all possible options. This is the easiest. It can be frustrating when my answer is not 'yes' or 'no' because my answer is 'others'.

Researcher: About 'Filter questions or contingency questions'... as you have seen, this question offer two choices, if you decide to choose the second choice that requires you skip to the sixth question. Is there any problem responding to this kind of question?

An interviewee: No, there is not a problem. I do not get confused.

Researcher: How about this 'rating question'? The five-scale rating.

An interviewee: No, there is not a problem. It like the general surveys that I have completed before.

Researcher: OK, how about the matrix questions?

An interviewee: Oh, this provides too many choices. This type of question makes me confused because of the labelling of the options. It is difficult to answer; I do not like the matrix question. However, I can answer about frequency.

Researcher: How about 'the multiple option questions'?

An interviewee: They are easy to understand.

Researcher: How about 'the ordinal questions'? (these questions provide nine options)

An interviewee: I understand that they are a rank of numbers.

Researcher: Should it be used on the Internet?

An interviewee: No problem either on paper or the Internet, but it should be less than ten options.

Researcher: How about 'the open-ended questions'?

An interviewee: They are okay.

Researcher: Okay, one more question about types of survey question. How about the single choice questions?

All interviewees: They are no problem responding to the single choice questions.

Researcher: Now, I have asked all the questions. Is there any thing you would like to express your opinion on about the design of the on-line questionnaire?

Thank you for your time.

Focus group interview of six students from the Physical Education Faculty

Researcher: I am going to ask you about the way that you participate in a web-based survey. Let's start with the first step 'getting entry to the Internet-based survey'. Which invitation are you going to choose to enter the survey from university's homepage? Why would you choose it? (also show images of different invitation on the screen)

(after introducing myself and my research)

- a message box when a user clicks on any links on the homepage
- an advertising marquee as big as banner size
- a pop-up window when a user enters the web site

An interviewee: I would choose a pop-up window when the user enters the web site because it is clearly presented when entering the homepage and also it can be interesting because of color graphics.

Researcher: If the pop-up window presents only a text, there is no graphic decoration. What do you think?

An interviewee: Including graphics is better.

An interviewee: I think, I would choose to get into a survey from a message box when a user clicks on any link on the homepage because it seems to control the users use the web site.

An interviewee: This is better than making a link to the survey somewhere on the homepage which users can not see it clearly.

Researcher: Is there anyone choose the advertising marquee?

Ok, it is good that you are expressing your opinion. Well... let's move to the next question. Is the web site logo important for obtaining responses to online questionnaire?

An interviewee: Yes, it is. It better to have it and also it having only one is enough. The logo of web site can be placed in the top left corner. This should

be okay.

Researchers: Is there anyone have different opinion from this and can tell me why? If not, I would like to ask you that... Is a help section necessary for completing the online questionnaires?

An interviewee: Yes, it is. I think it should have it.

An interviewee: I have a different idea, for third-year university students like myself, I can say, they understand how to fill in an Internet-based survey form, but it should have it for other users.

Researcher: Should the demographic info section be obtained before or after completing the questionnaire?

An interviewee: I think it should be obtained before completing he survey because the respondents perhaps will concentrate more when completing the questionnaire.

Researcher: OK. Let's move to the next question, Are you likely to close a window when the survey asks you to complete your email addresses?

An interviewee: No, I am not. It is all right if the questionnaire belongs to my university or another organization that it trusted. However, the problem is I do not have an email address.

Researcher: Are you likely to close the window when the survey asks you to complete your ID numbers?

An interviewee: No, I am not likely to close the window. However, I will leave it blank because I worry about the effect which might happen in the future if I give a negative opinion.

Researcher: It is good that you're expressing your different opinions. There is no right and wrong about what you are going to do. Then I would like to ask you about which of the following is the most preferred online questionnaire format. There are two main types of online

questionnaire formats. The first type is scrolling page that include all questions in one page (also see an example on the screen). The second type is one or a few items per page which usually do not require users to scroll down in order to respond to the next question but the users need to click on a next button instead (also see an example on the screen).

An interviewee: I prefer the scrolling pages because it may be require use less click.

An interviewee: I think the one item per page.... Because it seems to be an easier way to check that I have completed all items on the questionnaires.

Researcher: Let's look at the detail of the survey elements. Is the status bar valuable in terms of knowing what per cent of the questionnaires is completed?

An interviewee: Yes, it is. It should provide a status bar.

Researcher: I would like to know. What is the approximate number of items to facilitate completion?

An interviewee: I think about 16-20 items perhaps up to 30 items is still okay.

Researcher: What is the maximum time that you are willing to spend to complete an online survey?

An interviewee: Not longer than 5-ten minutes.

An interviewee: Me too.

Researcher: If the survey requires completing an item that you have forgotten to respond to, what are you going to do?

An interviewee: If I forgot to do something, then I would go back to complete it, but if the questionnaire requires information that I do not want to give such as an email address I will close the window."

Researcher: Now, I have asked all the questions about elements of Internet-based

questionnaires. In the next section I am going to ask you about the icons used for items on web-based surveys. The first icon is a 'check box'. (also the researcher points to the check box on the screen) Do you know how to interact with this icon?

All the interviewees nodded their heads. Some said no problem.

Researcher: The second icon is an 'option button'. (also the researcher points to the option button on the screen) Do you know how to interact with this icon?

All the interviewees nodded their heads. Some said no problem.

Researcher: The third icon is a 'drop-down menu'. (also the researcher points to the drop-down menu on the screen) Do you know how to interact with this icon?

All the interviewees nodded their heads.

Researcher: Okay, I am going to ask you about your opinion about participating in different types of questions in the survey. I will show you the question then please indicate your response. Are there any problems, and what are the problems and what is the solution for the particular kinds of questions? Let's start with the dichotomous questions.

An interviewee: No, there is not a problem with dichotomous question.

Researcher: About 'Filter questions or contingency questions'... as you have seen, this question offers two choices, if you decide to choose the second choice that requires you skip to the sixth question. Is there any problem responding to this kind of question?

An interviewee: No, there is not a problem with filter questions.

Researcher: How about this 'rating question'? The five-scale rating.

An interviewee: It is difficult to decide between strongly agree and agree. It would be better to provide only three points on the scale. Whenever I see the

five scale items in the long questionnaire I am likely to quit the survey. This type of question takes time to think through.

Researcher: OK, how about the matrix questions.

An interviewee: They are also difficult to answer; I do not like the matrix question.

Researcher: How about 'the multiple option questions'?

An interviewee: No problem, they are easy to understand.

Researcher: How about 'ordinal question'? (these questions provide nine options)

an interviewee: Sometimes or perhaps rarely, I like to complete, but I prefer to order each item, I mean it should be a list of numbers in the drop-down box that I can select after I judge them, especially the long lists.

Researcher: How about 'the open-ended questions'?

An interviewee: They are okay.

Researcher: Usually, do you answer the open-ended questions?

An interviewee: Only the interesting topics.

Researcher: Okay, one more question about types of survey questions. How about the single choice questions?

All interviewees: It is not a problem to respond to single choice questions.

Researcher: Now, I have asked all the questions. Is there any thing you would like to express your opinion on about the design of the on-line questionnaire?

Thank you for your time.

Focus group interview of nine students from the Sciences Faculty

- Researcher: I am going to ask you about the way that you participate in a web-based survey. Let's start with the first step 'getting entry to the Internet-based survey'. Which invitation are you going to choose to enter the survey from university's homepage? Why would you choose it? (also show images of different invitation on the screen)
- (after introducing myself and my research)
- a pop-up window when a user enters the web site
 - an advertising marquee as big as banner size
 - a message box when a user clicks on any links on the homepage
- An interviewee: I would choose to enter the survey from a pop-up window when a user enters the web site because it looks more interesting with a colour graphic. Whenever it presents only a text, the invitation is boring. The cartoon makes students believe that the survey is not too formal.
- Researcher: If the pop-up window does not present with a cartoon, it is only text for invite you. Will you decide to choose the pop-up window?
- An interviewee: No, I won't choose it. I choose it because of the interesting graphic.
- Researcher: How about students who choose the message box when clicks on any links?
- An interviewee: I should select the message box because it keeps asking me, so I just do it.
- Researcher: How about all the rest?
- An interviewee: I will click from an advertising marquee because I intend to participate to the survey. I will not choose the pop-up window because the pop-up window will increase the downloading information time and affects other web pages display, making them slower. Also, it shares space on the screen.

Researcher: It is good that you are expressing your opinion. Well... let's move to the next question. Is the web site logo important for obtaining responses to online questionnaire?

An interviewee: Yes, it is. I think the general participants also need to know which organizations are providing this questionnaire. Also, only the little one is enough not the big one.

An interviewee: No, it is not necessary to have university logo on the survey form. This is because it just clicks from the university homepage.

Researchers: Is there anyone have different opinion from this and can tell me why?

If not, I would like to ask you that...

Is a help section necessary for completing the online questionnaires?

An interviewee: Yes, it is. It should have for other users, this might help people have the same understanding about directions.

An interviewee: But I think it is not necessary for university student level. They understand the clicking method. On the other hand, if the target group of a survey is primary school and secondary school students, it should provide a help section.

Researcher: Should the demographic info section be obtained before or after completing the questionnaire?

An interviewee: Before.

An interviewee: I think so, it should be obtained before completing because it can make sure that the respondent will complete this section, I mean not leave it blank. The survey should categorize the participant's demographics.

Researcher: OK. Let's move to the next question, Are you likely to close the window when the survey asks you to complete your email addresses?

An interviewee: If the email address is important, I will give it.

Researcher: This is on the condition that giving an email address is not for an incentive.

An interviewee: I think, I will not give my email address because why does the survey need it. Also it depends on the situation at that time or I might give a false one.

An interviewee: No, I am not. It is all right if it belongs to my university.

Researcher: Are you likely to close the window when the survey asks you to complete your ID numbers?

An interviewee: Yes, I am. Because it sounds like too personal a question.

An interviewee: No, I am not. I will fill when it belong to my university.

An interviewee: Depending on content of survey if it does not have any effect to my future I can give my ID numbers.

Researcher: It is good that you're expressing your different opinions. There is no right and wrong about what you are going to do. Then I would like to ask you about which of the following is the most preferred online questionnaire format. There are two main types of online questionnaire formats. The first type is scrolling page that include all questions in one page (also see an example on the screen). The second type is one or a few items per page which usually do not require users to scroll down in order to respond to the next question but the users need to click on a next button instead (also see an example on the screen).

An interviewee: I think the one item per page.

Researcher: Why do you think that?

An interviewee: Because the scrolling will be long, the length of survey makes me tired. It seems more adventure; also each page will not look too long.

This will give me more motivation to complete.

An interviewee: The scrolling pages because it uses fewer clicks. I also worry that the next page perhaps fails. The scrolling page gives enough information to assist me in terms of deciding to participate; if the page is long I will not participate.

Researcher: Let's look at the detail of the survey elements. Is the status bar valuable in terms of knowing what per cent of the questionnaires is completed?

An interviewee: No, it is not. It is not necessary to provide the status bar if the first section has informed respondents about the number of items and sequences of the survey. This is because I can see the length of web page from the scroll.

An interviewee: Yes, it is. It is better to have a status bar.

Researcher: I would like to know. What is the approximate number of items to facilitate completion?

An interviewee: Well, in fact, it depends on situation; if I am in a hurry to do something perhaps I will not participate.

Researcher: I would like to know the estimated numbers of items, please say any numbers.

An interviewee: Less than 20 items is possible.

Researcher: What is the maximum time that you are willing to spend to complete an online survey?

An interviewee: Not longer than 5-10 minutes. This is also depends on the topic of survey.

An interviewee: Not longer than five minutes. I prefer to complete it as short as possible.

Researcher: What is the topic you prefer to complete the surveys about?

An interviewee: A topic that I am interested in for example, a topic about sport.

Researcher: Good, how about the usage of a web site?

An interviewee: It should be just sufficient to do it because it also relevant to me.

Researcher: If the survey requires completing an item that you have forgotten to respond to, what are you going to do?

An interviewee: If I forget something and then the survey requires it, I will return to complete the survey. However, if it requires very personal information such as an ID number or too difficult questions that I do not want to answer, I will quit the Internet-based survey.

Researcher: Now, I have asked all questions about elements of Internet-based questionnaires. The next section, I am going to ask you about icons used for items on web-based surveys. The first icon is a 'check box'. (also the researcher point the check box on the screen) Do you know how to interact with this icon?

All the interviewees nodded their heads. Some said no problem.

Researcher: The second icon is an option button. (also the researcher point the option button on the screen) Do you know how to interact with this icon?

All the interviewees nodded their heads. Some said no problem.

Researcher: The third icon is a drop-down menu. (also the researcher point at the drop-down menu on the screen) Do you know how to interact with this icon?

All the interviewees nodded their heads.

Researcher: Okay, I am going to ask you about your opinion about participating in different types of questions in the survey. I will show you the

question then please indicate your response. Are there any problems, and what are the problems and what is the solution for the particular kinds of questions? Let's start with the dichotomous questions.

An interviewee: No, there is not a problem with dichotomous questions.

Researcher: About 'Filter questions or contingency questions'... as you have seen, this question offers two choices, if you decide to choose the second choice that requires you skip to the sixth question. Is there any problem responding to this kind of question?

An interviewee: No, there is not a problem with filter or contingency questions.

Researcher: How about this 'rating question'? The five-scale rating.

An interviewee: I think it provides too many options, it should be fewer options. My opinion is the degree between each option is nearly the same. Whenever surveys provide a five-scale rating, I usually choose only neutral. This type of question takes time to analyse and it is difficult to decide between strongly agree and agree. It would be better to have about three points.

An interviewee: I can answer this type of question but I do not like it. If the label is a numbered like this, I am giving a score not a feeling. It sounds easier.

An interviewee: It is difficult to answer.

Researcher: OK, how about the matrix questions?

An interviewee: This is also difficult to answer; I do not like this type of question. When it asks about frequency it is acceptable. I think this type of question makes me confused.

Researcher: What are you likely to do when there are a lot of difficult questions in the survey? Quit and complete?

An interviewee: I will answer, it is no problem.

Researcher: How about 'the multiple option questions'?

An interviewee: They are okay. I know that I can choose all that apply.

Researcher: How about 'the ordinal questions'? (these questions provide nine options)

Most interviewees: I don't like them. They take time to think about.

Researcher: How about 'the open-ended questions'?

An interviewee: They are okay.

Researcher: Usually, do you answer the open-ended questions?

An interviewee: Well... if I am interested in the topic of the questionnaires, then I will complete them.

Researcher: Okay, one more question about types of survey question. How about the single choice questions?

All interviewees: It is no problem to respond to the single choice questions.

Researcher: Now, I have asked all the questions. Is there any thing you would like to express your opinion on about the design of the on-line questionnaire? Thank you for your time.