

Usability Measurement of Malaysia Online News Websites

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Abstract

The online newspapers entered the internet in the mid-nineties and since then it has become more and more common to read news online. There is a long tradition of designing newspaper in print but today there is a demand from both academics and practitioners for more knowledge about how to design a usability news sites. Usability is one of the major factors that determine the successfulness of a website. It is important therefore to have a comprehensive measurement method to assess the usability of websites. This research focuses on website usability issues and evaluating four Malaysia's online news: The Star, The New Straits Times, Berita Harian and Utusan Malaysia. Based on literature research, a 24 questions evaluation questionnaire has been formulated, which break into four parts in order to evaluate the usability of their online news websites. A non-probability sampling of 80 frequent online news readers were selected as respondents for this study purposes. The results of analysis show the good and bad usability aspects of their website. Result also shows that New Straits Time news website obtained the highest satisfaction from the participants. Respective website designers and developers can improve their websites based on these results.

Keywords: Usability Measurement, Online News Websites

1.0 Introduction

Malaysia newspapers have long tradition and centuries of experience behind today's format. Pages, headlines, columns and fonts have been tuned in form and function. They are all part of a usability and universal accepted product. Newspapers have an internationally recognizable layout, i.e. the broadsheet or tabloid format, familiar to readers all over the world [1]. The online newspapers appeared only a few years ago in the mid-nineties, and since then both academics and practitioners have continued to ask for more knowledge about how to design usability news sites. There are three questions about usability that should be asked when designing a system, especially interactive system [2]:

1. How can a system be developed to ensure its usability?
2. How can the usability of a system be demonstrated or measured?
3. Is there any significant differences on usability for different group of client?

Many web-based interactive systems have been developed since last decade. With web authoring tools, producing websites becomes easy. Even inexperienced information providers can create their own websites. However, authors of these websites usually create their websites with a content and structure from their own perspective rather than the users' point of view. Besides, some authors just transform the information from printed form to web pages without adapting for presentation on the Web [2].

Therefore, evaluating usability of a website is important. However, problems in getting usability results used more in development are basically due lack of usability of the usability evaluation methods and results. Usability evaluation methods that can be classified as expert based evaluations (heuristic or analytical), user based evaluation methods (observational, experimental, survey evaluation) or a mixed approach (pluralistic usability walkthrough), taking as reference a particular usability guideline set (such as visibility of system status, match between system and real world, user control and freedom, error prevention, flexibility and efficiency of user, aesthetic and minimalist design [3]). The precision of usability evaluation method itself will determine the accuracy of the evaluation. By using different evaluation methods, different results may be obtained for the usability of the same system.

ISO 9241-11 defines usability and explains how to identify the information which is necessary to take into account when specifying or evaluation usability of a visual display terminal in terms of measure of user performance and satisfaction. Guidance is given on how to describe the context of use of the product (hardware, software or service) and the relevant measures of usability in an explicit way. Particularly, ISO 9241 - part 11 define the usability as the extent to which a product can be specified

users to achieve specified goals with effective, efficiency and satisfaction in specified context of use.

In this paper, we study from research to obtain knowledge about how to design a usability news sites and we present a set of questionnaire which evaluates the usability of the Malaysia online news websites in term of its effectiveness, efficiency and satisfaction, where the three major terms used in this paper are defines as follow according to [4]:

- *Effectiveness*: Accuracy and completeness with which users achieve specified goals
- *Efficiency*: Resources expended in relation to the accuracy and completeness with which users achieve goals
- *Satisfaction*: Freedom from discomfort, and positive attitudes towards the use of the product

The structure of this paper is as follow. In the next section, a review of usability evaluation methods is presented followed by the ISO 9241-11 usability framework in section 3.0 and research methodology in section 4.0. The design of usability evaluation questionnaire is described in section 5.0. The data analysis and results are presented in section 6.0 and section 7.0 is the conclusion of this paper.

2.0 A Review of Usability Evaluation Methods

Usability is an important aspect of software products [5]. Several studies have shown that in addition to functionality and reliability, usability is a very important success factor [6]. Usability inspection is the generic name for a set of methods that are all based on having evaluators inspect a user interface. Typically, usability inspection is aimed at finding usability problems in the design, though some methods also address issues like the severity of the usability problems and the overall usability of an entire system. Many inspection methods lend themselves to the inspection of user interface specifications that have not necessarily been implemented yet, meaning that inspection can be performed early in the usability engineering lifecycle. According to Mack and Nielsen [7], the evaluation methods can be summarized into following categories:

- *Heuristic evaluation*: the most informal method and involves having usability specialists judge whether each dialogue element follows established usability principles.
- *Heuristic estimation*: a variant in which the inspectors are asked to estimate the relative usability of two (or more) designs in quantitative terms.

- *Cognitive walkthrough*: uses a more explicitly detailed procedure to simulate a user's problem-solving process at each step through the dialogue, checking if the simulated user's goals and memory content can be assumed to lead to the next correct action.
- *Pluralistic walkthrough*: uses group meetings where users, developers, and human factors people step through a scenario, discussing each dialogue element.
- *Feature inspection*: lists sequences of features used to accomplish typical tasks, checks for long sequences, cumbersome steps, steps that would not be natural for users to try, and steps that require extensive knowledge/experience in order to assess a proposed feature set.
- *Consistency inspection*: has designers who represent multiple other projects inspect an interface to see whether it does things in the same way as their own designs.
- *Standards inspection*: has an expert on an interface standard inspect the interface for compliance.
- *Formal usability inspection*: combines individual and group inspections in a six-step procedure with strictly defined roles to with elements of both heuristic evaluation and a simplified form of cognitive walkthroughs.

According to Jakob Nielsen, heuristic evaluation, heuristic estimation, cognitive walkthrough, feature inspection, and standards inspection normally have the interface inspected by a single evaluator at a time (though heuristic evaluation is based on combining inspection reports from a set of independent evaluators to form the list of usability problems and heuristic estimation involves computing the mean of the individual estimates).

In contrast, pluralistic walkthrough and consistency inspection are group inspection methods. Many usability inspection methods are so easy to apply that it is possible to have regular developers serve as evaluators, though better results are normally achieved when using usability specialists. Most of the work published concerns technical issues (e.g. different communication protocols, document formats and Web programming tools), or issues about the design of Web sites from a usability perspective [8]. On the other hand, Benbunan-Fich has categorized usability evaluation methods into four categories [9]:

- *Objective performance*: measures the capability of the visitors using the website in terms of time taken to complete specific tasks through the system

- *Subjective user preferences*: measure the users' performance preferences to the system by asking them to elicit their opinions or use questionnaire for rating the system
- *Experimental*: based on controlled experiments to test hypotheses about design and their impact on user performance and preferences
- *Direct observation*: inspect and monitor the users' behavior while they are interacting with the system to detect usability problems,

K.C. Thiam and S.S. Siti claimed that each method has its strengths and weaknesses. Website designers or developers need to select suitable evaluation methods based on certain factors. The factors include stage of design, novelty of project, number of expected users, criticality of interface, cost of product and finances allocated for testing, time available and experience of design and evaluation team.

Jakob Nielsen claimed that usability is about human capabilities and users' needs which do not change nearly as rapidly as technology. He also claimed that human factors remain the same decade after decade. This shown that website usability is a human issues which should be examined based on a set of well defined guidelines or standard. In fact, most of the usability guidelines available focus on how human beings feel, look, and use websites. Effectiveness, efficiency and user satisfaction are the main considerations when discussing about website usability. Also, he mentioned that the usability inspection methods are well suited as part of an iterative design process where they can be combined with other usability evaluation methods like user testing [10]. This research therefore takes the approach of subjective measures by using evaluation questionnaires according to the ISO 9241-11 usability framework which is going to be discussed in the next section. It aims to measures users' satisfaction, efficiency and effectiveness of four Malaysia online newspapers.

3.0 ISO 9241-11 Usability Framework

ISO 9241-11 explains how to identify the information that it is necessary to take into account when specifying or evaluating usability in terms of measures of user performance and satisfaction. Guidance is given on how to describe the context of use of the product and the measures of usability in an explicit way. It includes an explanation of how the usability of a product can be specified and evaluated as part of a quality system, for example one that conforms to ISO 9001. It also explains how measures of user performance and satisfaction can be used to measure how any component of a work system affects the quality of the whole work system in use [4].

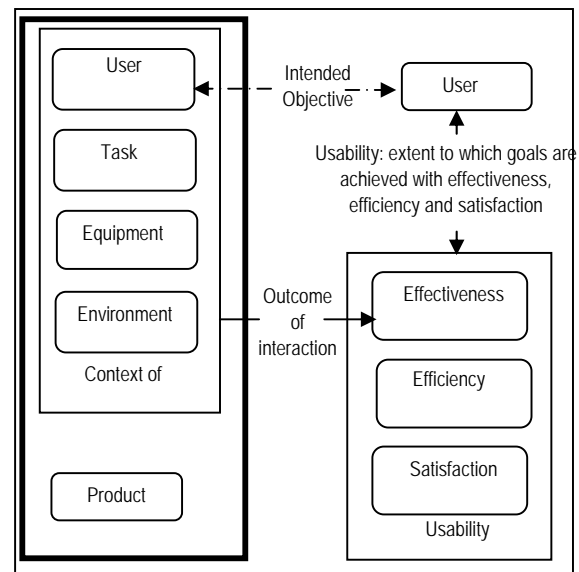


Figure 1: Usability framework

The framework describes the components of usability and the relationship between them. In order to specify or measure usability it is necessary to identify the goals and to decompose effectiveness, efficiency and satisfaction and the components of the context of use into sub-components with measurable and verifiable attributes. The components and the relationships between are illustrated in Figure 1.

When specifying or measuring usability, the following information is needed [4]:

- A description of the intended goals
- A description of the components of the context of use including users, tasks, equipment, and environments. This may be description of an existing context, or a specification of intended contexts. The relevant aspects of the context and level of detail required will depend on scope of the issues being addressed. The description of the context needs to be sufficiently detailed so that those aspects of the context which may have a significant influence on usability could be reproduced
- Target or actual values of effectiveness, efficiency and satisfaction for the intended contexts.

3.1 Usability Measurement and Choice of Measures in ISO 9241-11

ISO 9241-11 provides information to support measurement of usability. For example, description of the characteristics

of users can assist with the selection of users to participate in evaluation. Identification of users' goal can assist with the selection of appropriate tasks for usability testing or reviews. The characteristics of the environment in which a product is likely to be used need to be described if that environment has to be simulated to ensure the validity of test results

The choice of measures and the level of detail of each measure is dependent on the objective of the parties involved in the measurement. The relative importance of each measure to the goals should be considered. According to [4], if it is not possible to obtain objective measures of effectiveness and efficiency, subjective measures based on the users' perception can provide an indication of effectiveness and efficiency. This is relative important in this research.

3.2 Effectiveness, Efficiency and Satisfaction

According to ISO 9241-11, measures of effectiveness relate the goals or sub-goals of the user to the accuracy and completeness with which these goals can be achieved. For example if the desired goal is to accurately reproduce a two-page document in a specified format, then accuracy could be specified or measured by the number of spelling mistakes and the number of deviations from the specified format, and completeness by the number of words of the document transcribed divided by the number of words in the source document.

On the other hand, measures of efficiency relate the level of effectiveness achieved to the expenditure of resources. Relevant resources can include mental or physical effort, time, materials or financial cost. For example, human efficiency could be measured as effectiveness divided by human effort, temporal efficiency as effectiveness divided by time, or economic efficiency as effectiveness divided by cost. If the desired goal is to print copies of a report, then efficiency could be specified or measured by the number of usable copies of the report printed, divided by the resources spent on the task such as labor hours, process expense and materials consumed.

Satisfaction measures the extent to which users are free from discomfort, and their attitudes towards the use of the product. Satisfaction can be specified and measured by subjective rating on scales such as discomfort experienced, liking for the product, satisfaction with product use, or acceptability of the workload when carrying out different tasks, or the extent to which particular usability objectives (such as efficiency or learnability) have been met. Other measures of satisfaction might include the number of positive and negative comments recorded during use. Additional information can be obtained from longer-term

measures such as rate of absenteeism, observation of overloading or under loading of the user's cognitive or physical workload, or from health problem reports, or the frequency with which users request transfer to another job.

4. Research Methodology

The methodology adopted by this research is shown in Figure 2. The research first studies the issues related to website usability. These include concept of usability and usability evaluation methods. Based on the study, the evaluation method was determined. Particularly, this research methodology is similar to the research methodology conducted in [2] that allows the frequent online news readers to rate the usability of evaluated websites. Similarly, our assumption is questionnaire data can be both reliable and valid for assessment of user satisfaction with websites or computer-based application. A descriptive research design based on survey was selected and a non-probability sampling of 80 respondents were selected for this investigation.

As mention earlier, this research is aims to investigate the usability of four Malaysia online newspaper website. The front-page and its link are illustrated in Illustration 1 to Illustration 4 in the appendix:

In addition, this research work is adopted [2] website usability evaluation criteria and it shows important aspects of website usability, we can be further classified into 4 categories according to component of ISO 9241-11:

- content, organization, and readability,
- navigation and links,
- user interface design, and
- Performance and effectiveness

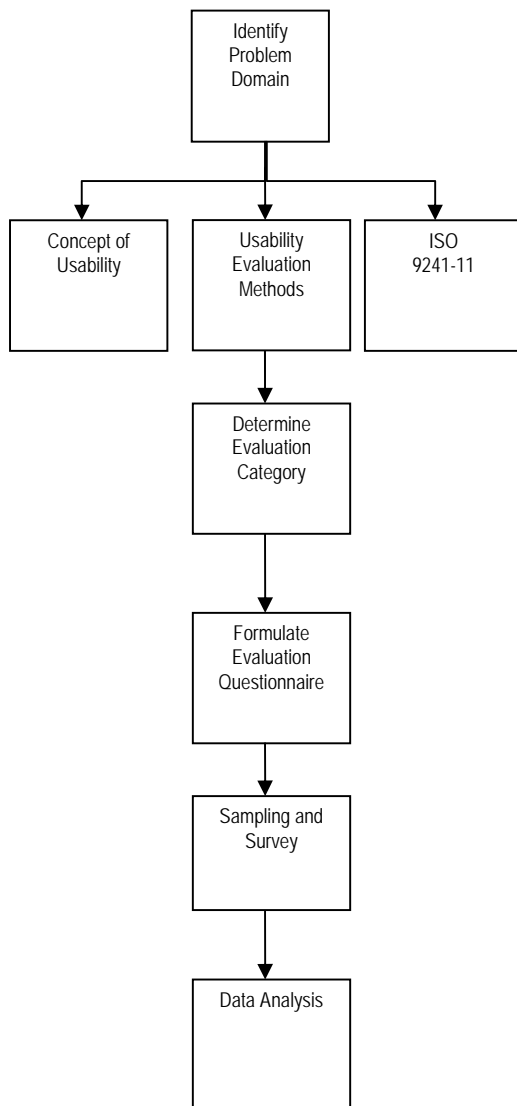


Figure 2: Research Methodology

5. Design of Usability Evaluation Questionnaire

In order to design the usability evaluation questionnaire, 6 questions are formulated for each category based on the evaluation criteria in [2]. Five response options are available to the questionnaire suggested below, we use the corresponding merits such that: 0.0 - Strongly Disagree, 0.25 - Disagree, 0.50 - Fair, 0.75 - Agree, and 1.00 - Strongly Agree. We use this style of ordinal scale instead of any traditional point used in questionnaire, so that it is much easier for compile the usability level of the particular websites.

The following guidelines are used when designing and developing the evaluation questionnaire

- Evaluate aspects that are closely related to human factors, or those issues that are user-centered
- Evaluate subjective user satisfaction based on objective and clearly defined usability evaluation criteria
- Easy to use and present clear and comprehensive port to the users
- Provide feedback to users if possible

Questions for evaluating content, organization and readability are:

- This website contains most of my interest material and topics and they are up-to-date
- I can easily find what I want at this website.
- I am comfortable and familiar with the language used.
- The content of this website is well organized.
- Reading content at this website is easy
- I need not scroll left and right when reading at this website.

Questions for evaluating navigation and links are:

- This website provides useful cues and links for me to get the desired information.
- I can easily know where I am at this website.
- It is easy to move around at this website by using the links or back button of the browser.
- The links at this website are well maintained and updated.
- The website does not open too many new browser windows when I am moving around.
- Placement of links or menu is standard throughout the website and I can easily recognize them.

Questions for evaluating user interface design are:

- This website's interface design is attractive
- I am comfortable with the colors used at this website
- This website contains no feature that irritates me such as scrolling or blinking text and looping animations
- This website has a consistent feel and look
- This website does not contain too many web advertisements
- The design of the website makes sense and it is easy to learn how to use it

Questions for evaluating performance and effectiveness are:

- I need not wait too long to download a file or open the link in the website.
- I can easily distinguish between visited and not-visited links.
- I can access this website most of the time.
- This website responds to my actions as expected.
- It is efficient to use this website.
- This website always provides clear and useful messages when I don't know how to proceed

6. Data Analysis and Results

The steps for evaluating four Malaysia online news websites as follows:

- Each respondent answers the usability evaluation questionnaire for four selected online news websites
- Participants' response is collect manually
- Merits are assigned according to response for each question. The merits are then accumulated based on the four usability categories
- Mean value for each category is considered as the usability point for that category. Overall website usability point is the mean value of usability points for the four categories and usability level is determined by the usability points.

Table 1 shows the summary details of 80 participants were chosen purposively for this study. 66% of them are students of Faculty of Computer Science and Information Technology, University of Putra and the others are IT executive. High percentage of the participants are frequent online news readers and between 1 to 3 years of experiences. They were asked to navigate the four Malaysian online news website and answer to the set of questionnaire.

Table 1: Demographic Characteristics of the study subjects

	Mean	Min	Max	
Age:	25.58	19	32	
	Male	Female		
Gender:	38.75%	61.25%		
	Students	IT Executive		
Category:	63.75%	36.25%		
	<12 months	1-3 years	3-5 years	>5 years
Online news reading exp.:	7.69%	59.9%	16.23%	16.18%
	Uncertain	Never	Everyday	Several times/ week

Reading Frequency :	34.7%	0%	52.30%	29%
	Malay	English	Chinese	
Mother tongue:	57%	12.2%	30.8%	

Five options are available for each question. The options and corresponding merits are shown in table 2

Table 2: Options for Malaysia online news evaluation questionnaire and corresponding Merits

Option	Strongly Agree	Agree	Fair	Disagree	Strongly Disagree
Merit	1.00	0.75	0.50	0.25	0.00

According to [2], Usability point for a category, x, is defined as:

$$X = [\Sigma(\text{Merit for each question of the category})] / [\text{number of questions}]$$

Table 3 shows the usability levels and the corresponding usability points.

Table 3: Usability Points and Corresponding Usability Levels

Points, x	Usability Level
0<=x<=0.2	Bad
0.2<x<=0.4	Poor
0.4<x<=0.6	Moderate
0.6<x<=0.8	Good
0.8<x<=1.0	Excellent

Table 4 to table 7 shows the summary of the usability evaluation for the four Malaysia online news website.

Table 4: Usability Evaluation Results for NST

Category	NST	Usability Level
Content, Organization, and Readability	0.916	Excellent
Navigation and links	0.875	Excellent
User interface design	0.771	Good
Performance and effectiveness	0.687	Good
Overall	0.812	Excellent

Table 5: Usability Evaluation Results for The Star

Category	The Star	Usability Level
Content, Organization, and Readability	0.750	Good
Navigation and links	0.645	Good
User interface design	0.583	Moderate
Performance and effectiveness	0.500	Moderate
Overall	0.619	Good

Table 6: Usability Evaluation Results for Utusan

Category	Utusan	Usability Level
Content, Organization, and Readability	0.708	Good
Navigation and links	0.708	Good
User interface design	0.458	Moderate
Performance and effectiveness	0.521	Moderate
Overall	0.598	Moderate

Table 7: Usability Evaluation Results for Berita Harian

Category	Berita Harian	Usability Level
Content, Organization, and Readability	0.542	Moderate
Navigation and links	0.666	Good
User interface design	0.521	Moderate
Performance and effectiveness	0.417	Moderate
Overall	0.536	Moderate

Table 8 to table 11 shows the details of usability evaluation results for all the four categories of evaluation on NST Online website.

Table 8: Evaluation Results for Content, Organization, and Readability

Usability Criteria	Point	Usability Level
This website contains most of my interest material and topics and they are up-to-date	1.000	Excellent
I can easily find what I want at this	0.875	Excellent

website		
I am comfortable and familiar with the language used	0.875	Excellent
The content of this website is well organized	0.875	Excellent
Reading content at this website is easy	0.875	Excellent
I need not scroll left and right when reading at this website	1.000	Excellent

Table 9: Evaluation Results for Navigation and Links

Usability Criteria	Point	Usability Level
This website provides useful cues and links for me to get the desired information	1.000	Excellent
I can easily know where I am at this website	0.875	Excellent
It is easy to move around at this website by using the links or back button of the browser	0.750	Good
The links at this website are well maintained and updated.	0.875	Excellent
The website does not open too many new browser windows when I am moving around	0.875	Excellent
Placement of links or menu is standard throughout the website and I can easily recognize them	0.875	Excellent

Table 10: Evaluation Results for User Interface Design

Usability Criteria	Point	Usability Level
This website's interface design is attractive	0.875	Excellent
I am comfortable with the colors used at this website	1.000	Excellent
This website contains no feature that irritates me such as scrolling or blinking text and looping animations	0.750	Good
This website has a consistent feel and look	0.500	Moderate
This website does not contain too many web advertisements	0.625	Moderate
The design of the website makes sense and it is easy to learn how to use it	0.750	Good

Table 11: Evaluation Results for Performance and Effectiveness

Usability Criteria	Point	Usability Level
I need not wait too long to download a file or open the link in the website	0.625	Moderate
I can easily distinguish between visited and not-visited links	0.750	Good
I can access this website most of the time	0.875	Excellent
This website responds to my actions as expected	0.750	Good
It is efficient to use this website	0.750	Good
This website always provides clear and useful messages when I don't know how to proceed	0.375	Poor

7. Conclusion

This paper presents the usability of Malaysia's four news web sites after being evaluated by 80 participants. The participants were asked to navigate around the news website, and answered a 24 questions questionnaire based on their experience during they navigate the website.

The usability level of the particular news sites were determined by using the corresponding merits values from 0.00 to 1.00 due to its reliability. The greater the value shows greater satisfaction from the participants whereas the lower the value determined lower participants' satisfaction. Each of the particular news sites obtained its usability levels based on the corresponding usability point gain from the participants.

Result shows that New Straits Time news website obtained the highest satisfaction from the participants, followed by The Star, Utusan and finally Berita Harian. New Straits Time obtains the highest score among the 4 news websites in all categories. The Star and Utusan both obtained the Good usability level in the category of content, organization, and readability and navigation and links and moderate level in user interface design and performance and effectiveness. Whereas, Berita Harian obtained the Good level in navigation and link category and Moderate level for the other 3 categories. As shown in the result, The Star, Utusan and Berita Harian are only able to gain a Moderate usability level in the category of user interface design, as well as performance and effectiveness; more concern should be pay for these aspects.

Knowing the news websites usability level in the perspective of participants, the web designers and web developers are able to get known the current marketing demand. Besides, the improvement and amendments can be performed on the weak aspect in the websites in order to achieve higher usability level.

With concerning the Malaysia online news sites further research on the readiness to pay and the concrete market potential remains necessary. Future research can investigate in detail the substitution problem associated with conventional publication media and thereby, examining interrelated strategic issues publishers may face, if online news sites becomes a market success. The content side of this technology, as well as distributional aspects and pricing strategies need to be analyzed, as users might expect various product versions with different market prices. In fact, there are many challenges in studying the usability of website technology in this way. The Web is growing rapidly and new technical solutions are developing continuously, as well as new usage forms. This

makes qualitative, longitudinal studies necessary for an understanding of the research issues we are interested.

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