

# Balancing between Usability and Aesthetics of Web Design

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**Abstract—** Web visual aesthetics and its usability play very important roles in determining the success of the Website. It is difficult to decide which aspect needs to be given more attention when it comes to designing a Website as aesthetics is focusing on the 'look' and 'feel' while usability is stressing on its functionalities. There is no perfect answer which aspects of the Web design are more important than the others. In addition, it is also difficult to have a balance of these two seemingly contrary objectives of Web design. This research focuses on how to balance the aesthetics design and the usability of Web design. This study also investigates methods to evaluate Web page's usability and aesthetic appeal, the role of these two aspects play in the Website design and also the relationship between these two aspects. The results of study provide a tangible concept on how the Web usability and the Web aesthetics design affect each other and methods to balance between the Web usability and aesthetics design. The contribution of this paper is to provide guiding principle to the Website developer in order to develop a Website which is well-balance in usability as well as its aesthetics aspect.

**Keywords—**usability; aesthetics; Web design; Web page

## I. INTRODUCTION

The massive growth spurt of Internet had change the way to design and develop a Web page. In relation to this, Web page's aesthetic appeal becomes increasingly important aside from its usability aspect [1]. Hence, both of these aspects need to be addressed in order to develop an ideal Web page. Based on the international standard ISO 9241-11("ISO 9241: Part 11,"2007), the main concerns of usability are the efficiency, effectiveness and satisfaction [2]. However, aesthetic appeal determines the satisfaction factor. This indicates that aesthetics and usability are the significant aspects to be considered when it comes to developing a Web page.

In software development, aesthetics are regard to its interface design. It is a subjective judgment as it is different among human beings and it strongly depends on the culture and personality of that person [3]. Aesthetics of Web page refers to its attractiveness in catching attention of the user to view the information [4]. It is whether to focus on the usability or aesthetics are rooted in one of the oldest debates which are form verses function. There is no ideal solution in

deciding which aspect to focus on, either usability or aesthetics appeal in designing a Website. This is due to its difficulty to adapt to these two seemingly contrary objectives of a Web site design at the same time.

From graphic designer perspectives, the user interface should be visually interesting, aesthetically appealing, unique and entertaining. On the other hand, usability experts strongly disagree as the user interface should be simple and the tasks should be able to be completed quickly and effectively. Focusing on either one aspect only will make the other aspects suffer great consequences [5].

Therefore, the poorly understood relationship between aesthetics and usability of the Web page motivates this study to be carried out since there are only a few studies that have been done in this area. Apparently, many studies have been done on the other aspects such as accessibility [6] and complexity [7]. Hence, this leads to a critical problem for most of the Web designers, as they could not develop a Website that is interactive and usable at the same time. Lacking of such guidelines and frameworks motivate us to propose a work on this issue. A famous quote says, "First impression is the last impression", so the aesthetics and usability aspects of designing a Web page should be balance as they are more marketable.

The objectives of this paper are to investigate the relationship between aesthetics, methods of measuring the aesthetics value, their effects on the Website, users' perceptions toward Website design in terms of aesthetics appeal as well as usability aspect, and developing guidelines for designing a Web page that is balance in usability and aesthetics aspects.

This paper is organized as follows: Section II presents background of problems. Next, Section III studies related work of usability and aesthetics done by other researchers. Section IV describes the Web design perspective in terms of usability and aesthetics. Subsequently, Section V discusses the empirical method used to perform an experiment that investigated Web site usability and aesthetics value. Section VI discusses the proposed work based on the results of the study. Finally, Section VII concludes the paper.

## II. PROBLEM BACKGROUND

Cai et al. [8] state that most of the Web developer will only focus on the functionality of their Web page, neglecting the aesthetics aspect especially the beginner level of Web developers. Most of them do not understand the roles and importance of visual aesthetic in designing a Web page. However, the tradeoff for high aesthetics Web site are slightly lower usability and transfer time delay as to compensation for high content of graphic and multimedia component in a Web page [9]. Hence, it is important to show that aesthetics value of Web site does really contribute to the user satisfactory and the overall usability of the Web site.

Two most common methods, objective performance measures and subjective user evaluations used by usability researchers and practitioners to evaluate and compare different systems and design features do have different results [10]. In addition, there is no scientific method exist to evaluate the aesthetic accurately, since it is a nature for human to have pleasure experience to the aesthetics and something that is beautiful [11]. It is too subjective to answer whether the Website has high quality of aesthetics.

Since graphic designers often require the user interface to be visually interesting; while usability experts believe the design should be simple in order for the tasks to be accomplished in shorter time; it is important to have proper guidelines on how the aesthetics best influence the user satisfactory and usability of Web page to optimize the usability [10]. It is important to have real empirical statistic to show that aesthetics of the Web site really contribute to the usability of the Web site from the user's perspective.

## III. RELATED WORK

Recent human-computer interaction (HCI) research seeks to understand the role of visual aesthetics in interaction design [6]. However, understanding the subject of visual aesthetics has been a pressing problem for researchers. In a study on visual aesthetics, many researchers argued whether to view visual aesthetic objectively or subjectively. The former approach views it as a measurable object which eventually leads to the creation of models in measuring the aesthetics values. Both work of Zain et al. [4] and Filonik and Baur [3] studied on the methods of measuring aesthetics values by applying mathematical formulae.

On the other hand, some authors prefer to associate visual aesthetics as an immeasurable construct. In other word, they view visual aesthetics subjectively. Different people may have different perspective in viewing a Web page and hence this matter can be very subjective [4]. The work of Cai et al. [8] provided a set of framework for measuring a Website subjectively. This framework can be applied in many different Website, especially for business usage with an aim of creating better business value.

Usability is one of the keys to effective Web design. However, there is an evidence showing that the user experience goes well beyond ease of use [5]. The interface of the system or the appealing of the Web page ('look and feel') has increasing becoming important [13]. Whitehead [14]

states that "usability is user and task dependent, as well as being related to how well the user is able to accomplish what they set out to do, how efficiently the user can do this". In recent year, studies have been conducted to test not only the usability but also the perceived usability of the system. Tractinsky et al. [1] have proved that there are strong relations between the perceived aesthetics and perceived usability of an information system application.

De Angeli et al. [13] evaluate two Websites with identical content but with different interactive metaphors. It comes to the conclusion that the Website with menu-based interface had better usability and was perceived by the user that it can provide better content. It shows that the aesthetics appeal has a capability engaging end fulfilling with the end users and generating the affective response towards the product or application. From other point of view, we can say that the interface design has the ability to influence the system or the product acceptability [12].

The original approach of the heuristic evaluation for evaluator is to inspect the interface individually to make sure independent of evaluation, thus avoiding bias. During the evaluation, the evaluator inspects the interactive elements of the application to compare them with a list of recognized usability principles. There are different versions of heuristic evaluation. Therefore, selection of the version must be careful [15].

Tayana et al. [16] propose the Web design perspectives-based (WDP) usability evaluation technique that is more efficient and effective than the heuristic evaluation technique. The WDP technique considers the use of four Web design perspectives that is Conceptual (conceptual elements), Presentation (characteristics of interface element and layout), Navigation (how the information access element is associated) and Structural (the architectural structural of the application components). The team has improved the WDP technique in version 2 by reviewing the relationship between heuristics and the design perspectives.

## IV. WEB DESIGN PERSPECTIVE

### A. Web Usability

Usability is one of the important aspects of Web page and Web site design [14]. If the usability is left unconsidered during the design phase, it will have negative impacts on the successful of the product or the business being done. From the business point of view, it is going to lose on profit opportunities.

Usability is referring to the ease of use, which people are able to use the tool easily for achieving their goal in specific environment [17, 15]. It has strong relationship with the learn-ability, remember-ability, efficiency, reliability and the user satisfaction of Web page

Generally, usability is task and user-dependent or people-oriented [14]. It greatly depends on the target audience and the usability goal. Different usability goals and different target audiences need to come with different results or designs. It measures the efficiency and effectiveness of user completing their work [14, 17], the satisfaction of user in

conducting their work and the ability the user accomplish with the design environment [14]. In short, the Web usability is a test on the successfulness of user in doing some task or finding information in the Web page [17].

There are a few sets of method for evaluating the Web usability. Web usability is complex and wide ranging. All these usability criteria are able to be measure separately or in combination of few criteria [14]. A few aspects in the Web page or Web site that need to be taken into consideration [17]: (1) the loading and the response time, (2) navigation problem, (3) the hardness of the message, and (4) the efficiency of the system support the user use to perform their tasks.

Since the usability is task- and people-oriented, the process of finding the end users as participants in evaluating the Web page or the Web site needs to be very careful. The participant's culture, primary languages, background of experience and the software knowledge are all the criteria that need to be taken into consideration. These qualities play very important role as these can alter the results of the evaluation.

Table I shows the way to measure the usability criteria in the Web usability evaluation. There are many potential approaches for Web usability evaluation [17]. Some of the common methods are: (1) Have a usability inspection. In this approach, a group of usability experts are invited to judge and comment on the user interface design regarding the services provided (2) Conduct end user test. A group of target audiences are invited to try out the Web application. The performance of the audiences at completing the formal task is recorded and analysed (3) Usability checklist by the usability experts is used to evaluate the Web application and (4) Conduct a listening test. The end user or the target audience is being guided by the application tester through the Web application to be evaluated. All comments and the reaction from the users are recorded to be analysed. Karvonen [12] uses Usability Inspections; evaluation method based on experts which is less expensive and is mainly used in industrial environment. However, [17] also state that this method in evaluating the usability is greatly subjective. In Usability Inspections method, it greatly relies on the inspectors' skills and experience. Moreover, different results are produced when evaluations are made by different inspectors. Evaluation Web page with user involvement and usability problems are discovered through the observation and interaction with the user while they are performing the given task. Involving the end users in the usability test, it helps the designer in selecting the layout, fronts, styles or using the multimedia component in the Web application [18].

TABLE I. WAYS TO MEASURE THE USABILITY [17]

Usability criteria	Way to Measure
Learn-ability	The time user takes to perform their particular tasks.
User Satisfaction	Measure through the user satisfaction after using the system via the survey instrument.
Reliability	The capability in completing the task correctly.
Efficiency	The way users use the system in completing their task.

As the businesses and individuals race to place Web page and content on the World Wide Web (WWW), the usability has become an extremely important aspect in the Web page and the Web site design [14]. Usability is designed to support the user in finding the desired information, where it strongly related to the ease of use of the system [14, 16, 17]. This means the usability works as navigator in the Web page or Web site to navigate the user in completing their task or achieving their goal via Web site [17]. Ease of use affects the users' performance and their satisfaction [15]. Usability makes the site easy for the users in understanding the Web content, and using the function of the Web pages. As a results, the Web page users can complete their tasks with more efficient, consequently users will feel satisfied with the performance of the website.

Considering only the usability will affect the 'look' and 'feel' of the Web design these feature has a capability of engaging and fulfilling the end users and generating the affective response towards the product or application [13]. Due to many challenges to ensure better loading time or response time, developers need to limit the number of images or the volume of media used per Web page, or reduce the colour depth or format the image to smaller size [15]. With this approach, the Web page has the actual usability but low perceived usability. Moreover, it is difficult for the Web site to attract people if the design is inappropriate. Design has the ability to influence the system or the product acceptability [13].

#### B. WebVisual Aesthetics.

There is a growing need of developing a framework on visual aesthetics as Cai et al. [8] point out that it has been neglected in Web design in spite of its focuses on human thought and practice. Their focus is on the functionality of Web page. The term "aesthetics" usually refers to the philosophical study of art and beauty [3] or in other word, pleasing appearance or effect. In software development, aesthetics is regard to interface design. Aesthetics of Web page refers to its attractiveness in catching attention of the user to view the information [4]. Usually, aesthetics choices are decided under subconscious level.

In measuring aesthetics values, a debate arises as question of what are the appropriate elements should be taken into consideration. Zain et al. [4] managed to come out with Aesthetic Measurement Application (AMA) as their objective tool for unbiased aesthetics measurement, measured six essential elements of aesthetics values, which are balance, equilibrium, symmetry, sequence, rhythm as well as order and complexity. In relation to this, other aesthetics measurements studied by Filonik and Baur [3] such as Birkhoff's aesthetics measure and pattern measure derived that aesthetics measure is influence by order and complexity of objects. However, Mbipom [6] and Michailidou et al. [7] suggest five design dimensions, which are clean, clear, organize, beautiful and interesting to be measure. Yet, there are still rooms for the improvement as these measurement methods can only measure certain aesthetics elements. Other important elements of aesthetics



such as the harmony and variety of a Web page design have been omitted.

In addition, the effect of visual aesthetics of Web design should not be overlooked. Studies have shown that visual aesthetics enhances positive user experience [3, 6]. Users tend to perceived that a Web page to be less visually complex [7] and more accessible [6]. Yet, interactive design of Web page can induce curiosity and pleasure despite it is being considered as poor usable Web application [19]. Therefore, a visually appealing Web page will result in a more involved and patient user [3].

Previous Websites are designed with little regards to the importance and concern of aesthetics. Aesthetics is important, as it has shown to enhance positive user experiences [6, 7]. This can be shown by the work of Zain et al. [4] whereby aesthetics is a significant aspect in getting users' attention to browse the entire Web page. It exerts a strong influence in attracting customers to browse their Website. Consumer reaction to aesthetics aspects of a Website is becoming a determinant factor of consumer behavior [8]. This is because visually pleasing Website would posse greater attraction as it might aid in gaining users' attention and interest [4]. Successively gaining users' attention is vital since it is the prerequisites in order for users to constantly browse the Website. The bottom-line is that aesthetics aspect in Web design plays important role in the process of interaction between user and the interface of the Web page

## V. EXPERIMENT

### A. Material

A study was performed to evaluate a Web page in terms of usability and aesthetics. The selected and adapted Web page for the experiment is been taken from [www.celcom.com.my/cep/](http://www.celcom.com.my/cep/) as shown in fig 1. The Web page is been chosen as it is perceived as visually appealing with engaging interactive style with the animated and rotating menu and usable. It represents business genre Website in Malaysia.

The Website uses "Adobe flash" component to enhance the aesthetics of the Web site, while scarifying a little bit on the usability of the Web site since user may not be able to browse the page if the user does not have the "Adobe flash player", also the search engine crawler is not able to crawl the content of the flash component. However, most of the Internet user nowadays can install the flash player easily. Hence, compatibility is not a big issue. In addition, the Website consists of HTML page that makes it able to be selected by the search engine crawler.

### B. Method

We use questionnaire to evaluate the usability and the aesthetics of the Web site. Thirty undergraduates from the School of Computer Sciences, University Science Malaysia, from different specialization participated in the experiment. The questionnaire is been distributed equally according to the gender, that is 15 males, and 15 females. Each specialization is allocated with five questionnaires.

The questionnaire consists of 14 questions. The first seven questions focus on the Web aesthetics aspects while the remaining questions focus on the Web usability. For the aesthetics aspects, the questions let the user evaluate the overall design such as attractiveness, well organized, design clarity, layout, colour and font of the Web site. On the other hand, for the usability aspects, the questions let the user evaluates the ease of use, information finding, task performance, navigation and loading speed of the Web site. All participants are required to answer the questionnaires based on the Web page. It is an important methodology as we could get a sense of the person's belief and idea judging from their answers.

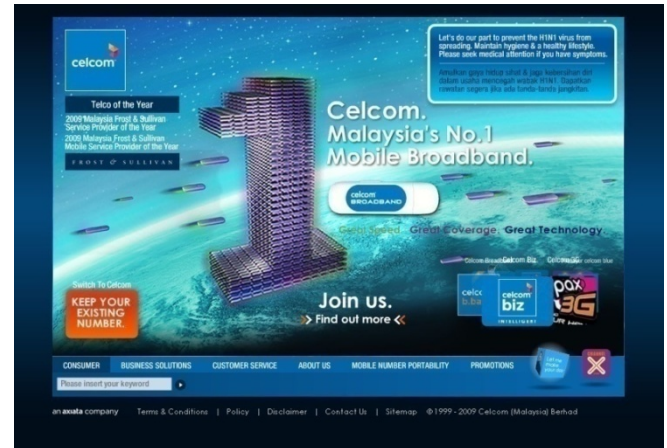


Figure 1. Homepage of chosen Web page

At the beginning of the experimental session, participants are required to take their 10-minute time to explore the Web page by themselves prior to answering the questionnaires. Then we explain and observe the questionnaires as they fill in their answers, which features captured their preference and the reasons behind it. Each question is rated by the scale one to five. Each participant answers specific questions regarding his/her reaction to the Web site and on the aesthetics and usability of the site. Participant is been asked to register a broadband package in the questionnaire. This is to ensure that the participant is been exposed to the Web page while answering the question. The more the user is satisfied with the corresponding aspect state in the question, the higher the mark will be.

All the participants are not been asked to directly rate the aesthetic and the usability aspect in the Web design to reduce the possibility of simply giving rate to the aspect. This way of conducting the survey is chosen instead of online survey. Conducting the survey via the online survey tool is more efficient in uploading the survey questions, downloading the results and being able in getting more participants via sending the online survey's URL through email. However, by comparing both methods, the chosen method has more chances in interacting with the participants. Moreover, the behavior of the participant during the information finding within the Web page can be observed. All the responses are categorized according to gender and specialization. Finally, the participants' responses are been analyzed.

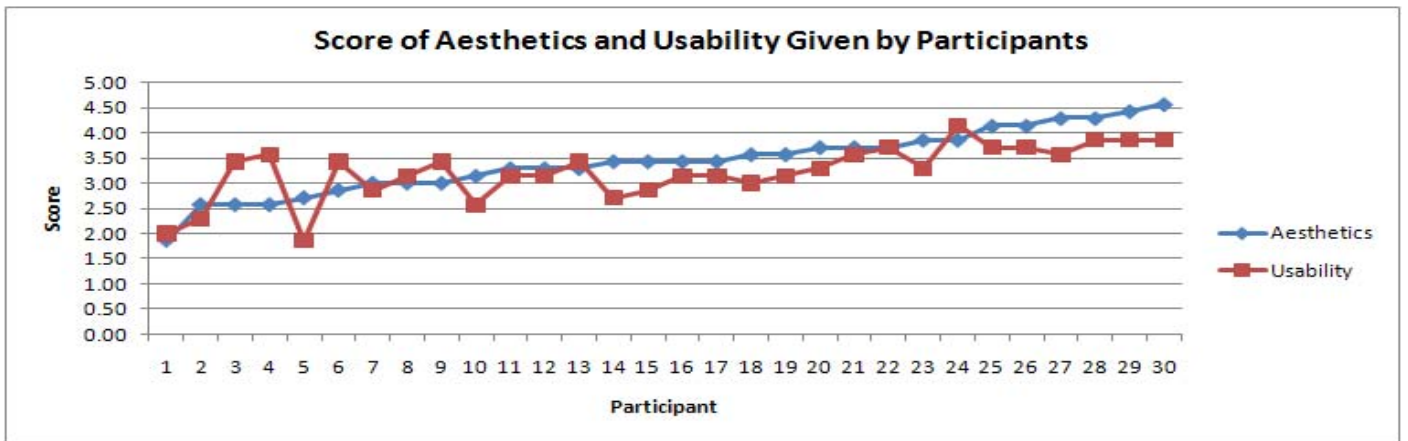


Figure 2. Score of aesthetics and usability given by participants

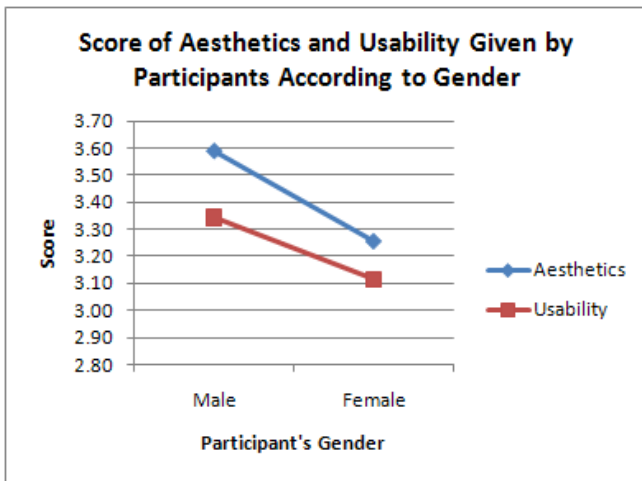


Figure 3. Score of aesthetics and usability given by participants according to their gender

## VI. PROPOSED WORK

Fig 2 is plotted based on the sorted aesthetics values and followed by its usability value. It shows that the Web page is perceived to be slightly more aesthetics than its usability aspect. In relation to this, it revealed an interesting finding as we can derive that whenever the visual aesthetics is perceived to be high, its usability may not be perceived to be high as well. However whenever visual aesthetics is perceived to be low, its usability would not be perceived to be high.

When analyzing the results based on gender, we notice a surprising finding which is not as speculated. At first we hypothesize that female participants' preferences will be more likely driven by visual aesthetics whereas usability aspects for male participants. However, that is not what we found out. From fig 3, it is revealed that there are no difference users' preferences in terms of gender. A clear majority agreed that visual aesthetics has a greater influence when using the Web page. Yet, it seems that male participants weigh more on visual aesthetics values compared to the female as the gap between aesthetics and usability scale becomes wider.

Significant relationship between usability and aesthetics is revealed in our study. Visual aesthetics plays important role in influencing users' preferences. However, too much attention being addressed to visual aesthetics during Web site design can degrade its usability. Both aspects must be properly addressed since this study indicates that visual aesthetics greatly influence its usability in satisfying users.

The first impression is very important. Normally users will assign their perceived values to the system based on their first impressions and give high positive impression to visually appealing Web page. From the users' point of view, Web page that has appealing aesthetic value is also high in usability value. They will continue adding a positive value to the application as they find the consecutive Web pages are usable but tend to ignore the application otherwise. Hence, some Web site may fully focus on the aesthetics on their introduction of the Web site, but focus on the usability for the rest. This is because the first page will give the first impression to the new visitor of the Web site and it does not need to be loaded frequently since it will not be loaded anymore when the user browses for the content.

We should focus on the aesthetics of the Website but do not neglect the usability of the Web site. We should pay more attention to the design of the content, but the design of the content should not hinder the content from the user. There are some advices to develop a Web site which concern both of the aesthetics and usability aspect. (1) The link should be designed in the way to look like a link (For example, the banner in the first page of the Celcom Web site does not look like a link but it is a hyperlink as shown in fig 4). Each design component must reflect its intended function [18]. (2) Also, a Web page with text and graphics will have more significant delay when transferred in low bandwidth, compare to Web page with text only [9], hence when we insert multimedia component especially the pictures, we should always consider the loading time of the multimedia components. (3) We should make sure that the content of the Web site should be compatible to common Web browser, such as Internet Explorer, Firefox, Safari, Opera and Netscape. (4) Identify your audience. Different categories of the audience will have different expectation of the design included the selection of layout, colour, font size of the Web

site [18]. (5) The page which needs to refresh frequently should not be burdened with a lot of multimedia components



Figure 4. The right hand top corner text is actually a hyperlink

## VII. CONCLUSION

The studies have demonstrated the relation between the user perception on the interface aesthetic and their perception on the system usability. The visual appealing has a great influence on the user judgment on the system performance and the system perception usability. Users have recognized that one Website with high visual-appealing is able to provide more information compare to another with less visual-appealing. In addition, aesthetically pleasing websites may promote higher enjoyment for the users to continue exploring the usability aspects.

This is very important to balance both usability and aesthetics in the Web page or the Web site design. The Web application should be designed in both ease to use as well as 'perceived' ease to use. If the perceived usability of the Web page is high but the aesthetics value is otherwise, it definitely will affect the user satisfaction. User perceive the Web page with high aesthetically pleasing design is more usable compare to the Web pages that is designed otherwise; therefore, it is very vital that both usability and aesthetics work together and create a Web page which is well balanced in both aspects. Web page or the Web site need design with high aesthetically and functioning well.

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