

# A New Set of Attributes to Integrate Web Usability and Web Aesthetics in the Scope of Public Universities Websites

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**Abstract:** *In the scope of a public university, the use of a website is becoming vital in supporting the daily function of the university. Public university websites are now becoming more like a hub that offers various services for various categories of users. With the different type of users, it posed a new challenge for web designers, especially in term of integrating the web usability and aesthetics to ensure it is suitable for all users. Both usability and aesthetics have its own importance in the overall web performance thus requires a proper integration mechanism. This research described the identification of a new set of attributes to assist web designers in designing a public university website that integrates web usability and web aesthetics. Using several usability evaluation models, usability attributes that are directly concerned with or influenced by aesthetic elements are extracted to form a new set of attributes that will integrate web usability and web aesthetics. The attributes identified were learnability, readability, use of multimedia, navigation and loading speed. The attributes identified will be useful for public universities web designers in designing a better website that not only provide optimum usability but also pleasing aesthetics.*

**Index Terms:** *Web aesthetics, web design, web usability.*

## I. INTRODUCTION

A public university website is its face to the world as it plays the role of the virtual representative of the university. The website is the first line of digital interactions between the universities and the patrons may it be the students, staff or the public [1, 2]. Due to this, it is important that the design of the website be properly done for it reflects the image of the universities. Websites are designed to provide content and services that serve various stakeholders' requirements which includes students, faculty members, alumni and researchers. Potential students can retrieve information about admission details, current students can enquire about their exam results or register for new courses, staff can follow the university's current news and alumni can browse for announcements regarding job openings. Websites present new opportunities and challenges to establish, build and manage customer relationship. This is because the increasing number of usage of website due to various functions it provides will result in further development of the website in term of functions thus creating new challenges [1].

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In this paper, it will firstly discuss the research background regarding the challenges in term of integrating web usability and web aesthetics. Next, the methodology in identifying the attributes are divided into two parts which are usability model selection and extraction of integrating attributes. The next part will be the discussion of the attributes that was selected. Finally, the conclusion of the research will describe the contribution of the research and future work.

## II. RESEARCH BACKGROUND

One of the challenges in designing websites is ensuring the usability of the website. Web usability can be describe as making the design simple enough to ensure customers, who by nature tend to be goal-driven, can complete their task as timely and painlessly as possible [3]. However, usability is not the only area that needs to be prioritized in a web design process. Designers and researchers alike assumed that usability was the main reason for active users' involvement with a certain website [4]. However, there is an argument that indicated that the users' initial aesthetic response to websites which refers to the spontaneous emotional reaction based on visual preferences, majorly effects whether users later assume the websites as usable or not [5-7]. Websites that are perceived by users as beautiful are also perceived as usable websites.

Usability and visual aesthetics can be said as two important aspects in web design. These two aspects should be integrated in the design process. Website ease of use (usability) should be an important precursor for perceived visual appeal (visual aesthetics) of a website [8, 9]. Website ease of use is an important element of visual aesthetics of the website. If a website is difficult to navigate, it is difficult for the users to evaluate the website as visually appealing [9]. This again shows the relationship between website aesthetics and usability and how it influences one another to produce a quality website. Each element must not be too overwhelming towards the other as too much attention put on the aesthetic design of the website will make the website look amazing but will cause frustration because users have difficulty in finding what they are searching for due to its complex design [10]. A good web design must provide not only beauty and appeal, but also optimum levels of usability, due to its influences towards the state of the users [11]. In term of web design practice, usability and aesthetic are two distinct components within the overall architecture of a website that should be look as separate components that



should be designed in a parallel manner due to its influence to one another [12]. To ensure that the web designers can design a website that integrates web usability and web aesthetics, attributes that integrates both component should be identified to be developed as guidelines for web designers. These attributes will ensure that the usability and aesthetic component of the website complement one another.

There is insufficient scientific method available to integrate the web usability and visual aesthetics of a website [13, 14]. Due to the nature of humans to experience pleasure to aesthetics and something beautiful, it is too subjective to indicate if the website has pleasing aesthetics which later will or will not influence users' perception of usability. From one perspective, graphic designers usually need the user interface to be visually pleasing and interesting while on the other hand, usability experts believe that the design should be simple to ensure users' tasks can be accomplished in a shorter time [8, 9, 13, 14]. Due to this contrast in perspective, it is important to have proper description on how to integrate both web usability and web aesthetics of web pages to maximize its functionality as both usability and aesthetics plays an important role towards the overall performance of the website.

Most research that was done describe the key elements of an effective website design that focuses more on usability and quality evaluation [15-19]. However, these key elements are only used to evaluate websites based on its usability and content, not describing how to integrate usability and the aesthetic elements used by web designers. This is important because web designers need to design their web aesthetic that will contribute to a usable website. No matter how pleasing the design, if it is not usable, the website is not considered good. Previous research [4, 8, 9] shown that web aesthetic does have some influence in determining the usability of a website, thus it is important that there is a method to ensure that the aesthetic elements used in the web design process will contribute to a better web usability. This is why there is a need to integrate both usability and aesthetics.

### III. METHODOLOGY

In identifying the new set of attributes to integrate web usability and web aesthetics, the research methodology are divided into two phases which are, Phase 1: Identifying the Usability Models and Phase 2: Identifying the Integrating Attributes.

#### A. Phase 1: Identifying the Usability Models

A systematic literature review was conducted to identify appropriate models to be analyzed in selecting the integrating attributes. The SLR consists of three steps which are planning the review, conducting the SLR and reporting. When planning the SLR three research questions were formed. Table 1 will illustrate the research questions formed.

**Table. 1 Research Questions for SLR**

No	Research Questions
RQ1	What are the areas of previous studies in web usability and web aesthetics?
RQ2	What is the relationship between web usability and web design?
RQ3.	What are the models that described the design process of both usability and aesthetics of a website?

Based on the research questions that were formed, the SLR was conducted based on certain inclusion and exclusion criteria that assisted researcher in selecting the appropriate research articles. Papers that were considered are based on the discussion in the abstract, the overview of the research, the challenges discussed in the paper, analysis of the findings and discussions regarding web usability and web aesthetics and also the theories and models involved.

Based on the research questions, it was identified that there was a lack of research in the area of integrating web usability and web aesthetics. Most of the studies focus on the measurement of web usability and web aesthetics. Most of the web usability measurement is based on several criteria such as content and organization of information. It is also identified that web usability and web aesthetics do indeed have an influence towards one another. However, there is no model that described the design process of a website, especially in term of integrating both usability and aesthetics. Due to this, to identify the new set of attributes to integrate web usability and web aesthetics, models that described both usability and aesthetics in its attributes will be chosen. Based on the SLR, five usability models are identified which are, the User Experience Model, Voluntary Product Accessibility Template (VPAT), Web Design Perspective (WDP), Barrier-free Evaluation Model and SCANMIC Model. These models were selected because they described usability as a whole with mentions of aesthetic elements. Most of these models function as an evaluation of usability as a whole.

#### B. Phase 2: Identifying the Integrating Attributes

Due to the five models identified from the SLR was usability measurement focused, usability attributes that are directly concerned with or influenced by aesthetic elements was identified. To identify the appropriate attribute, keywords was used to identify those that are suitable. The keywords are based on the web aesthetics definitions where aesthetics include graphics, text, animation, color, fonts, image, layout structure, texture and typography [20-22]. Any attributes that concern with these elements are extracted from the various models. Table 2 will illustrate the attributes that are extracted from each model.



**Table. 2 Attributes Extracted from Usability Models**

Models		Attributes directly influenced by aesthetic elements
User Experience Model		-Learnability
Voluntary Product Accessibility (VPAT)	Product Template	-Screen layout -Consistency -Use of text, color, images and animation.
Web Design Perspective (WDP)		-Learnability
Barrier-free Evaluation Model	Evaluation	-Usage of fonts and colors -Ease of navigation -Use of multimedia
SCANMIC Model		-Screen design -Accessibility -Navigation -Consistency -Media Use

Based on the analysis of the attributes derived from the various models, there are some redundancies shown in the attributes. Using a deductive approach, the main concern of the redundancies was analyzed and a new keyword is chosen that described the main usability concern. From the previous model, a new set of attributes is obtained to describe the usability attributes that are directly concerned with web aesthetics. Due to the fact that these attributes are influenced by both usability and aesthetics of the website, it will be used as the integrating attributes to integrate usability and aesthetics of the website. The new set of attributes is as follows: Learnability, readability, use of multimedia, navigation and loading speed.

#### IV. FINDINGS & DISCUSSIONS

From the extraction of the models, a new set of attributes was established that function as the integrating attributes between web usability and web aesthetics. The attributes are as follows:

##### A. Learnability

Most of the theories described that the aesthetic design of the website should promote a consistent design. The design consistency is important to speed up user's learning and usability of that website level. The keyword learnability is chosen instead of consistency is due to the fact that learnability is the main concern. Consistency is the way to achieve better learnability. Most theories and models includes learnability as a key attribute in ensuring web usability (User Experience Model, Web Design Perspective (WDP), and Barrier-free Evaluation Model).

##### B. Readability

In designing websites, web designers must ensure that the content of the website is readable. Most of the theories discussed previously have included that the readability of the content as a key attribute in ensuring the usability of a website. In terms of providing a readable content, the Voluntary Product Accessibility Template (VPAT), Barrier-free Evaluation Model and the SCANMIC Model described the aesthetic elements that influence readability is the proper usage of fonts, colours and page layout.

##### C. Use of Multimedia

Two theories (Barrier-free Evaluation Model and SCANMIC Model) includes the usage of multimedia as the key attribute in ensuring web usability. These two theories described that most web designers will include various types of multimedia as tools to convey information and also to attract the attention of users of the website.

##### D. Navigation

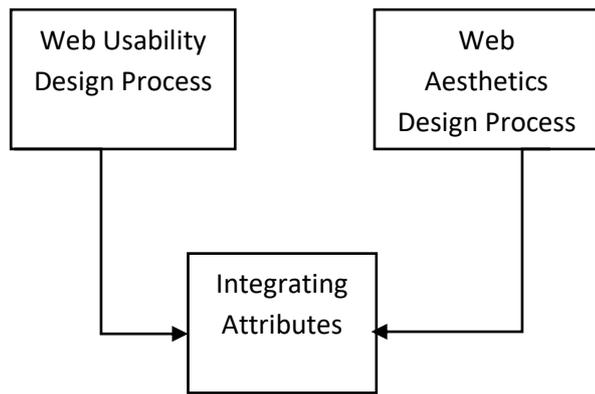
In terms of usability, ease of use is very important. A website should be able to be used easily. One way to ensure ease of use is through ensuring good website navigation. Especially for a public university website, where the content of information is huge and concerns with various functions for various users, a proper navigation is important to ensure that users are able to navigate through the website without any problem. In the User Experience Model, no specific mention of navigation is included, but there is a discussion on efficiency. With a proper navigation, the website will be more efficient in providing the information needed by users. On the other hand, the Voluntary Product Accessibility Template (VPAT) mentioned accessibility as one of the attribute. A proper website navigation mechanism will ensure that the content of the website is easily accessible. The need of a proper navigation mechanism is specifically discussed in the Barrier-free Evaluation Model and SCANMIC Model as one of the key attribute to evaluate web usability.

##### E. Loading Speed

In the Web Design Perspective (WDP), Barrier-free Evaluation Model and the SCANMIC Model, a website should promote access in a timely manner. One way of ensuring fast access, loading speed of the website is vital. Loading speed is closely related to the usage of multimedia attribute. Due to the nature of aesthetic elements consist of various multimedia, it is important that the inclusion of various multimedia does not influence the loading speed negatively.

These five attributes will be used as the integrating attributes because it described usability based on aesthetic elements. However, these attributes will further improve the overall performance of the website after the usability and aesthetic design of the website was done in a systematic process. There are various methods that described the process in designing the usability and aesthetic of a website. The new set of attributes will be used after the web usability and aesthetic design have been conducted. This makes the new set of attributes flexible to be used in various web usability and web aesthetics, design process as it functions as an integrating attribute to ensure that what ever usability and aesthetic component design by the web designers are integrated. This will assist web designers in designing a website not only high in usability, but at the same time provide pleasing aesthetics. Figure 1 will illustrate the usage of the integrating attributes in the overall web design process.





**Fig. 1 Usage of Integrating Attributes in the Web Design Process**

**V. CONCLUSION**

The aim of this research is to identify a new set of attributes that integrates usability and aesthetics of websites. The attributes will be beneficial to the web designers in designing a better website and also contribute to the body of knowledge, especially in the area of web design and web usability. The attributes are meant to be used after the design of both usability and aesthetic is done through a comprehensive process and then used as a way to integrate both components. These attributes are not meant to replace existing guidelines, but to be used as supporting resource to assist web designers in designing a public university website, especially in term of usability and aesthetic design through a more systematic and comprehensive process. Further research can be done to explore more about designing a better web usability and web aesthetic design process to provide a more comprehensive web design model that focuses on usability and aesthetics.

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