The Characteristics of Aesthetic Screen Design

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Abstracts

The purpose of this paper is to discuss the important aspect of screen design which is aesthetics characteristics. Here, we present a set of screen characteristics that appear to be important determinants of acceptance with fourteen aesthetics considerations for graphics displays based on research founded by David Check Ling Ngo, L.S. Teo and J.G. Byrne [3,4,5]. First, we discussed the concept of aesthetics in general and then evaluate two differential screens design based upon these aesthetic guidelines. A survey was done to get a valuable insight on how screen aesthetics are important to respect the user interface design as well as to insure an aesthetically pleasing design. Finally, we draw the conclusions about the role of aesthetics elements in screen layouts design to support the human computer interaction (usability systems). The survey will look how to present good objects arrangement on the screen design based on aesthetic characteristics. The good arrangement is important to maintain consistency in the “look and feel” of each screen even when the objects change.

Keywords: Screen designs, Interfaces aesthetic, aesthetic characteristics, Human Computer Interaction (HCI), Usability.

1.0 Introduction

Screen design means the designer directs the user’s eye around the screen. It has a great impact on ease of use and visual appeal. A screen often has to present information clearly and also act as the focus for interacting with the system. This is a complex area involving some psychological understanding, as well as aspects of graphical design. There are at least two major factors to consider when designing a screen: Usability and Aesthetics. Usability refers to how easy or intuitive the screens are operated. Users should be able to quickly figure out what they are supposed to do it [6]. Aesthetics describe the characteristic of the screen appearance (screen composition). The interface aesthetics are important to prospective viewers and may help gain attention and build confidence in using computer systems. Therefore, it is important to understand what characteristics of screens influence user acceptance.

2.0 Aesthetic Elements for Screen Design

According to David Check Ling Ngo, L.S. Teo and J.G. Byrne [3,4,5] with related literature review on screen design, they have identified fourteen important characteristics of aesthetically pleasing objects considerations for graphics display: Balance, Equilibrium, Symmetry, Sequence, Cohesion, Unity, Proportion, Simplicity, Density, Regularity, Economy, Homogeneity, Rhythm, Order and complexity

2.1 Balance can be defined as the distribution of optical weight in a picture (layout). Optical weight refers to the perception that some objects appear heavier than others. Dark colours, unusual shapes, and larger objects are heavier, whereas light colours, regular shapes, and small objects are lighter. Optical weight is the ability of an element (graphic, text, headline, subhead and so on) to attract the user’s eye. Each element has optical weight as determined by its nature and size. The nature of element refers to its shape, color, brightness and type. Balance is determined by the weight of the elements and their position on the screen. Balance in screen design is achieved by providing an equal weight of screen elements, left and right, top and bottom. Figure 1 presents “good” and “bad” versions in balance study. Fig. 1(a) presents a balanced screen in which half of the weight is roughly in one side of the screen and half is on the other. Fig. 1(b) shows a layout in visual imbalance (it looks as if it will topple over).

2.2 Equilibrium is stabilization, a midway center of suspension. Equilibrium on a screen is accomplished through centering the layout itself. The center of the layout coincides with that of the frame. Equilibrium is somewhat related to balance. Equilibrium looks at visual centers, balance at visual weights. Figure 2 presents “good” and “bad” versions in equilibrium study. In Fig. 2(a) equilibrium is achieved by centering the layout itself. The center of the layout shown in Fig. 2(b) lies somewhat lower than the center of the frame.

2.3 Symmetry is axial duplication: A unit on one side of the centerline is exactly replicated on the other side. Vertical symmetry refers to the balanced arrangement of equivalent elements about a vertical axis, and horizontal symmetry about a horizontal axis. Radial symmetry consists of equivalent elements balanced about two or more axes that intersect at a central point. Symmetry can be used to ensure a balanced interface.
Balance can be accomplished through symmetry design or asymmetry design. *Symmetrical* balance is achieved through arranging similar elements such as two graphics of equal weight. *Asymmetrical* balance is achieved by arranging dissimilar elements, such as use two or more elements of smaller weight to balance one large element. Figure 3 presents ‘good’ and ‘bad’ versions in symmetry study. In Fig. 3a symmetry is achieved by replicating elements left and right of the screen centerline. Fig. 3b presents an asymmetrical design.

**2.4 Sequence** in design refers to the arrangement of objects in a layout in a way that facilitates the movement of the eye through the information displayed. Normally the eye, trained by reading, starts from the upper left and moves back and forth across the display to the lower right. Perceptual psychologists have found that certain things attract the eye. It moves from big objects to small objects, from bright colours to subdued colours, from colour to black and white, and from irregular shapes to regular shapes.

Figure 4 presents ‘good’ and ‘bad’ versions in sequence study. In Fig. 4a sequence is achieved by arranging elements to guide the eye through the screen in a left-to-right, top-to-bottom pattern. The eye starts from the upper left and moves back and forth across the display to the lower right. The opposite is true for Fig. 4b, where an arrangement and flow cannot be detected.

**2.5 Cohesion** in screen design, similar aspect ratios promote cohesion. The term aspect ratio refers to the relationship of width to height. Typical paper sizes are higher than they are wide, while the opposite is true for typical VDU displays. Changing the aspect ratio of a visual field may affect eye movement patterns sufficiently to account for some of the performance differences. The aspect ratio of a visual field should stay the same during the scanning of a display. Fig. 5 presents “good” and “bad” versions in cohesion study. In Fig. 5(a) cohesion is achieved by maintaining the aspect ratio of a visual field. Use of the screen in Fig. 5(b) may be affected by inconsistent aspect ratio of screen elements.
2.6 Unity. Unity is coherence, a totality of elements that is visually all one piece. With unity, the elements seem to belong together, to dovetail so completely that they are seen as one thing. Using similar sizes and leaving less space between elements achieve unity in screen design of a screen than the space left at the margins. Unity can be achieved by consistency in shapes, colors, text style and themes. Figure 6 presents “good” and “bad” versions in unity study. In Fig. 6(a) unity is achieved by leaving less space between elements of a screen than the space left at the margins. The elements are grouped together and surrounded by white space. The items in Fig. 6(b) look as if they are ready to move out from the screen.

2.7 Proportion. Down through the ages, people and cultures have had preferred proportional relationships. What constitutes beauty in one culture is not necessarily considered the same by another culture, but some proportional shapes have stood the test of time and are found in abundance today. Marcus [1] describes the following shapes as aesthetically pleasing:

- square (1:1),
- square root of two (1:1.414),
- golden rectangle (1:1.618),
- square root of three (1:1.732), and
golden double square (1:2).

In screen design, aesthetically pleasing proportions should be considered for major components of the screen, including windows and groups of data and text. Figure 7 presents “good” and “bad” versions in proportion study. In Fig. 7(a) proportion is achieved by creating objects with aesthetically pleasing proportions. The items are close approximations to the proportional rectangles described by Marcus. These proportions cannot be recognized in the items in Fig. 7(b).
2.8 Simplicity is directness and singleness of form, a combination of elements that results in ease in comprehending the meaning of a pattern. Simplicity in screen design is achieved by optimizing the number of elements on a screen and minimizing the alignment points. Figure 8 presents “good” and “bad” versions in simplicity study. In Fig. 8(a) simplicity is achieved by minimizing the alignment points. Fig. 8(b) has a lower simplicity measure since it has more alignment points.

2.9 Density is the extent to which the screen is covered with objects. Density is achieved by restricting screen density levels to an optimal percent. Figure 9 presents “good” and “bad” versions in density study. In Fig. 9(a) density is achieved by restricting screen density levels to an optimal percent. Fig. 9(b) presents a cluttered, cramped layout.

2.10 Regularity. Regularity is a uniformity of elements based on some principle or plan. Regularity in screen design is achieved through consistent spacing and grouping of components. While both simplicity and regularity depend on the numbers of horizontal and vertical alignment points, unlike simplicity, regularity is less sensitive to the number of elements on the screen. Figure 10 presents “good” and “bad” versions in regularity study. In Fig. 10(a) regularity is achieved by establishing standard and consistently spaced horizontal and vertical alignment points. The items in Fig. (b) are unequally spaced.

2.11 Economy. Economy is the careful and discreet use of display elements to get the message across as simple as possible. Economy is achieved by using as few sizes as possible. Figure 11 presents “good” and “bad” versions in economy study. In Fig. 11(a) economy is achieved by using only one size. Fig. 11(b) has a lower economy measure since it uses more sizes.
2.12 Homogeneity. The relative degree of homogeneity of a composition is determined by how evenly the objects are distributed among the four quadrants of the screen. The degree of evenness is a matter of the quadrants that contain more or less nearly equal numbers of objects. Figure 12 presents “good” and “bad” versions in homogeneity study. In Fig. 12(a) homogeneity is achieved by distributing the objects evenly among the four quadrants of the screen. The items in Fig. 12(b) are not evenly distributed.

2.13 Rhythm. Rhythm in design refers to regular patterns of changes in the elements. This order with variation helps to make the appearance exciting. Rhythm is accomplished through variation of arrangement, dimension, number and form of the elements. The extent to which rhythm is introduced into a group of elements depends on the complexity (number and dissimilarity of the elements). Figure 13 presents “good” and “bad” versions in rhythm study. In Fig. 13(a) rhythm is achieved through systematic ordering. The elements in Fig. 13(b) constitute a chaotic, confusing, disorganized appearance.

2.14 Order and complexity. The measure of order and complexity is defined as an aggregate of the above measures for a layout. The opposite pole on the continuum is complexity. The scale created may also be considered a scale of complexity, with extreme complexity at one end and minimal complexity (order) at the other.

3.0 Survey And Analysis

We have distributed a questionnaire randomly to 30 Information Technology (IT) students from Faculty of Computer Science and Information Technology, University Putra Malaysia and the results from all the respondents successfully gathered. The objective of this survey is to find out what the respondents think and understand about the aesthetics on screen design. The survey was divided into three sections.

3.1 Section A

Table 1 and Table 2 respond to the survey in Section A. All the respondents are screen layout users. 57% of the respondents have experience and knowledge in developed screen layout design and 43% never been developed before. Table 2 shows web site is the highest and most frequent screen layout design that they are using. The second one is Games screen. This is because most of them are IT students and usually they are using computer daily either for searching or have games for pleasures.
Section A:
To know in general their (respondent) participation in screen layout design covering their experience and their frequents using several types of screen layouts.

Section B:
To look the role and the important of aesthetic value in screen layout design based on user perception.

Section C:
This is an important part in the survey. The respondent was evaluated two Web site screens layout design of Screen A and B that are enclosed together with the questionnaire.

Screen A : Monterey Bay Aquarium Web Site
http://www.ed.uiuc.edu/courses/ci235/tutorial/composer/mbayaq.html
Screen B : Silat Cekak Hanafi Web Site
http://www.cekakhanafi.com

The objective is to get the feedback from respondents about these two screens, which one is better and satisfied based on their views and questions that distributed. Then, we find out why the majority respondents choice that screen. Here, we do our own observations to evaluate the screen layout design (the chosen screen) based upon fourteen aesthetic characteristics for according to our comprehensibility study.

Table 1: Percentages of respondents generally background about Screen layout

<table>
<thead>
<tr>
<th>Questions</th>
<th>Yes (%)</th>
<th>No (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Are you a screen layout user?</td>
<td>100</td>
<td>0</td>
</tr>
<tr>
<td>Have you develop any screen layout design for any system or application?</td>
<td>57</td>
<td>43</td>
</tr>
</tbody>
</table>

Table 2: Percentages of respondents in using various type of screen layout

<table>
<thead>
<tr>
<th>Types of Screen</th>
<th>Very Frequent (%)</th>
<th>Frequent (%)</th>
<th>Moderate (%)</th>
<th>Seldom (%)</th>
<th>Never (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ATM</td>
<td>33</td>
<td>50</td>
<td>13</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>Handset</td>
<td>23</td>
<td>27</td>
<td>23</td>
<td>20</td>
<td>7</td>
</tr>
<tr>
<td>Kiosk</td>
<td>13</td>
<td>20</td>
<td>27</td>
<td>30</td>
<td>10</td>
</tr>
<tr>
<td>Astro</td>
<td>27</td>
<td>27</td>
<td>17</td>
<td>20</td>
<td>10</td>
</tr>
<tr>
<td>Website</td>
<td>77</td>
<td>23</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Game</td>
<td>53</td>
<td>37</td>
<td>10</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

3.2 Section B

According to the table below, all the respondents agreed that a good screen layout design could affect the user for using it. Over 50% of the respondents believe the screen layout design can give impact to the student motivation learning and contribute in transferring the information affectively. However, the important of screen layout
design influence the user comprehensibility and productivity is 30% and 23% respectively.

<table>
<thead>
<tr>
<th>Questions</th>
<th>Important (%)</th>
<th>Moderate (%)</th>
<th>Not Important (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A good (harmony) screen layout design can attract the user for using it.</td>
<td>100</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Screen layout design can effect on the student motivation to learn</td>
<td>90</td>
<td>7</td>
<td>3</td>
</tr>
<tr>
<td>Screen layout design help to contribute transfer of information</td>
<td>73</td>
<td>17</td>
<td>10</td>
</tr>
<tr>
<td>Screen layout design influence the users comprehensibility for using the system</td>
<td>30</td>
<td>47</td>
<td>23</td>
</tr>
<tr>
<td>Screen layout design can influence the productivity</td>
<td>23</td>
<td>37</td>
<td>40</td>
</tr>
</tbody>
</table>

Table 3: Percentages of the importance of screen layout design

<table>
<thead>
<tr>
<th>Questions</th>
<th>SCREEN A</th>
<th>Unsatisfied (%)</th>
<th>SCREEN B</th>
<th>Unsatisfied (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>The overall of screen layout design</td>
<td>80</td>
<td>20</td>
<td>10</td>
<td>23</td>
</tr>
<tr>
<td>The objects arrangement on screen layout design</td>
<td>73</td>
<td>27</td>
<td>13</td>
<td>20</td>
</tr>
<tr>
<td>Screen visual presentations (Screen elements relate each other)</td>
<td>77</td>
<td>23</td>
<td>17</td>
<td>27</td>
</tr>
<tr>
<td>Display information</td>
<td>70</td>
<td>23</td>
<td>7</td>
<td>30</td>
</tr>
<tr>
<td>Screen layout design attract your attention</td>
<td>80</td>
<td>20</td>
<td>13</td>
<td>27</td>
</tr>
</tbody>
</table>

Table 4: Percentages of the evaluation based on two-screen layout design

3.3 Section C

According to the survey results in Table 4, we found that majority of the respondents are satisfied with screen A compares to screen B. Probably screen A has good interfaces design and attractive compare to screen B. That’s from respondents view perceptions. But, what actually the valuable insight on screen A that make user satisfied and respect with it interfaces? Here, we have done an observation on esthetics evaluation on both screens to respond the question. The observation is to evaluate the fourteen aesthetic characteristics that available inside the screen. It is based on our comprehensibility study on screen aesthetic characteristic (not aesthetic measuring and uninvolved mathematical calculation). The result from an observation is we agreed that screen A is good screen layout design compare to screen B. Screen A fulfilled the most aesthetic characteristic for screen design that listed by David Check Ling Ngo, L.S. Teo and J.G. Byrne[4]. See Table 5.

In general, the screen A implements the basic concept of screen design such as visual balance including equilibrium and symmetry. The screen design A also illustrates principle of consistency and simplicity. If you go to through this site, you will find that the navigation system throughout the pages is coherent, which ensures that users or visitor will find it easy to move from one page to another.

Table 5: Comparison Screen A and Screen B according to the 14 aesthetic characteristic for screen layout design

The screen layouts over the whole site are consistent. In a single screen, arrangement and harmony are seen among the navigation menu, text and images. The navigation image arrangements follow the rhythm in circle patterns. The shapes, colors, text style and themes are use consistency in the screen. They’re using the similar sizes and leaving the space between each image. By this way, each of the screen elements look related to each other’s and it fulfilled the unity and regularity concepts in screen design. Moreover, the arrangements of movement elements in a screen are in a sequence. As you can see, the navigation texts on the upper screen
displayed start from left to the right with a similar font size.

In addition, the explanation of the each development stage is brief yet to the point, and the image on the screen helps to tell story. The development of screen design also not complex where the information to be present will put in a single page and only the necessary information displayed. Uncomplexity information and small numbers of elements display on the screen can reduce the screen density. That’s a part of the aesthetic characteristic covered in Screen A without the users notice.

On the other hand, the Screen B has no concept of design basics such as visual balance, simplicity, unity, regularity or rhythm. As you can see, Screen B illustrates the inconsistent design and complex design. The components on the pages do not go well with each other. The huge image takes out much of the space of the screen. The important information becomes not that apparent. The screen present with a lot of information in single pages. The user or visitor needs to scroll down and you’ll see how this page is messy. Furthermore, there are a lot of texts and images displayed in the screen. Almost the whole of screen full with objects. There have no leaving space between the objects. Unnecessary information also displayed. Too many information make the screen look too busy and messy.

The screen design B is not harmony because the objects arrangements not follow the rhythm and sequence. The shapes, colors, text style and themes are using inconsistency. The unity concept also not achieved because the information that display not related each other’s.

4.0 Conclusion

The aesthetic qualities of screen design are important to take account by the interfaces designer because the aesthetic qualities of displays could help us to more reliably build displays that have these high qualities. Kiana K. Matthews, wrote, "Skillful visual design of computer screens with care given to color, typography, layout, icons, graphics, and coherency, substantially contributes to quality and usability"[2]. Aesthetics is the discipline that gives designers the tools to take care with screen layout. There are specific guideline recommendations for how to use the components in an effective and pleasing way. Here, aesthetic guidelines exist to help designers create more attractive screen layouts. Besides, the interface aesthetics are important to prospective viewers and may help gain attention and build confidence in using computer systems. As a conclusion, the designer needs to take consider all the aesthetics characteristics while designing or reviewing screens. The aesthetic elements of user interface are playing a greater role in affecting system usability and acceptability than we might be willing to admit. I believe that aesthetics, for this reason, should become a standard and important part of the HCI curriculum and discipline.

References


