Principles of Good Screen Design in Websites

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Abstract

Visual techniques for proper arrangement of the elements on the user screen have helped the designers to make the screen look good and attractive. Several visual techniques emphasize the arrangement and ordering of the screen elements based on particular criteria for best appearance of the screen. This paper investigates few significant visual techniques in various web user interfaces and showcases the results for better understanding and their presence.

Keywords: Balance, Economy, Predictability, Pleasing Proportion Regularity, Sequentiality, Symmetry, Unity, Visual Technique.

1. INTRODUCTION

Interface users expect the elements on the screen be arranged in order and clutter-free. Also, the users expect a clear distinction about various elements/controls displayed depending upon their purpose. UI designers need to put in effort so as to make user interface easy to use by reducing visual work & memory use of the users. UI designer should first consider the user's task when he/ she sketches for the elements to be placed on the user screen. UI designer must also consider or prepare a basic layout for arranging these screen elements depending upon the elements functionality, importance, and other UI design properties for a good screen design.

Jean Vanderdonckt [1] emphasizes on visual techniques grouped into five categories as a commonly accepted visual principle to guide in the arrangement of the layout frame components. The five groups are
a) Physical Techniques: Balance, Symmetric, Regularity, Alignment, Proportion and Horizontality.
b) Composition Techniques: Simplicity, Economy, Neutrality, Singularity, Positivity and
   Transparency.
c) Association and Dissociation Techniques: Unity, Repartition, Grouping and Sparing.
d) Ordering Techniques: Consistency, Predictability, Sequentiality and Continuity.
e) Photographic Techniques: Sharpness, Roundness, Stability, Representation, Subtlety,
    Leveling Realism and Flatness.

In a research by Ngo et.al.[2], have proposed a well-defined mathematical model for the fourteen esthetic characteristics like Balance, Equilibrium, Symmetry, Sequence, Cohesion, Unity, Simplicity, Density, Regularity, Economy, Homogeneity, e.t.c. The result has suggested the importance of these characteristics for designers of the interfaces. In addition to these research

studies there have been numerous other studies [5, 6, 7, 8, 9, 10, 11] which emphasize on various principles for user interface design to be more attractive and aesthetically pleasing.

The current study being reported in this paper has been carried out by students of Human Computer Interaction course, in the final semester of four year under graduation program. Students have been distributed among 30 batches; each batch consisting minimum of 4 students and maximum of 5 students. The investigative form of study has been carried out over five categories of websites, namely, a) Social network website interfaces b) Job site interfaces c) Shopping website interfaces d) Stock trading website interfaces e) E-mail interfaces.

The student batches were given forms consisting of visual techniques that need to be investigated over the respective website interfaces, and asked to fill them accordingly. The student batches have selected over 150 different popular websites that come under these 5 different categories. Each batch will investigate one web user interface per category, making 30 web interfaces per category for all batches. The duration of the study was around 3 months. The investigative form of study by the HCI students brought interesting and broad details about various user interface properties, characteristics, principles. We present all these in detail in the following sections of this paper.

In section 2, the presence of ordering of screen data and content for the investigated web user interfaces is highlighted. In section 3, the results of screen navigation and flow are showcased. Section 4 presents the 7 visual techniques under visually pleasing composition. Section 5 deals with pleasing proportions and finally section 6 concludes the paper. The figures representing the corresponding property or principle are taken from Galitz [3].

2. ORDERING OF SCREEN DATA AND CONTENT

The Screen elements must be arranged in a logically, meaningfully and sensibly so as to enable the user retain the information on the screen in his/ her short term memory with ease. One of the ways of achieving this is by arranging screen elements in a prioritized form according the user's needs and expectations. Well organized screens help users to find the information they need quickly.

According to Galitz [3], Common ordering schemes include a) Conventional b) Sequence of use c) Frequency of use d) Function or category e) Importance and f) General to specific. The table 1 below presents various ordering schemes and their percent of perceived presence in five different web interfaces studied & investigated by the students of HCI course.

S.No.	Ordering Scheme	Social Networking	Stock Trading	Emailing	Online shopping	Job site
1	Conventional	71	78	54	56	44
2	Sequence of use	87	87	85	87	84
3	Frequency of use	79	74	77	78	60
4	By Function or category	77	73	88	92	88
5	By Importance	71	61	73	96	72
6	General to Specific	83	87	77	78	68

TABLE 1: Screen Data and content ordering

When Comparisons are to be made between the information being presented on the screen; the students identified this aspect to be present more in stock trading website interfaces (at 43%) than other four types.

3. SCREEN NAVIGAVIATION AND FLOW

Every user expects the navigation and flow within the screen to be obvious and easy to accomplish. Galitz [3] says Navigation can be made obvious by grouping and aligning screen controls, judiciously using line orders to guide the eye. The table 2 below lists out various techniques that can be used to enhance Screen Navigation and flow experience. Also the table 2 shows the perceived presence of these techniques among the investigated five different web user interfaces.

S. No	Techniques/Arrangement/Orientation	Social Networking	Stock Trading	Emailing	Online shopping	Job site
1	Most important & Most frequently used elements or controls placed at the top left.	79	52	85	81	76
2	Grouping of elements observable on the screen.	88	91	85	100	84
3	Line borders for groups.	83	78	77	81	80
4	Identifiable difference among elements that a critical, important, secondary, peripheral.	48	57	50	78	68
5	Command buttons placed at the bottom within a group.	55	55	73	56	52
6	Eye movement from dark areas to light areas of the Screen.	71	82	81	85	80
7	Eye movement from big objects to little objects	83	74	73	81	84
8	Eye movement from unusual shapes to common shapes.	54	64	46	52	52
9	Eye movement from highly saturated colors to unsaturated colors.	75	65	77	74	83

TABLE 2: Screen Navigation and Flow

The Screen elements arrangement should reduce the overall number of eye and manual control movements needed to work with a screen. Top-to-bottom presentation of information stood best among other form of presentations in the research [3].

4. VISUALLY PLEASING COMPOSITION

Users are influenced by the symmetrical balance and weight of the titles, graphics, text, when scanning the interfaces initially [3]. Visually pleasing composition draws users' attention inherently and also makes positive impact on the users mind. The visual techniques like balance, symmetry, regularity, predictability, sequentiality, economy, unity and grouping will augment visual pleasing composition of user screen.

These above said techniques are investigated in the five different web interfaces for their presence, results of which are given in the following subsections.

4.1 Balance

Balance can be achieved by providing an equal weight of screen elements, left and right, top and bottom [3]. The opposite of balance is Instability. Balance on a screen is accomplished through centering the display itself, maintaining an equal weighting of components on each side of the horizontal and vertical axis, and centering titles and illustrations.
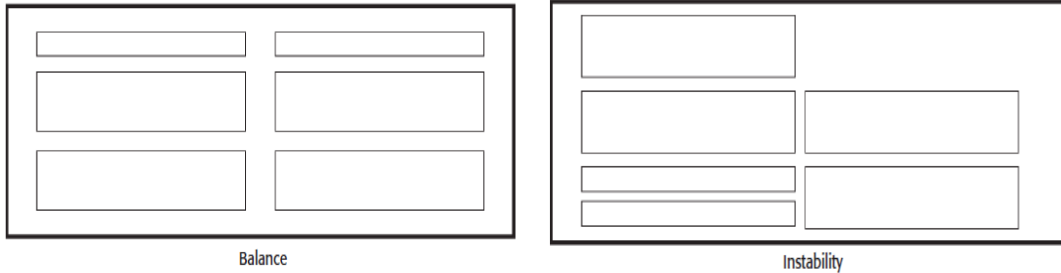

FIGURE 1: Balance & Instability.

The graph in the figure 2 below shows the perceived instances of occurrances of Balance and Instability among 5 different website interfaces investigated. For the web user interfaces of online shopping and job sites, the Balance is more when compared to the other three categories investigated. Users still seems to feel the presence of Instability in some screens and this may be due to the structure of the data and components of respective web pages.
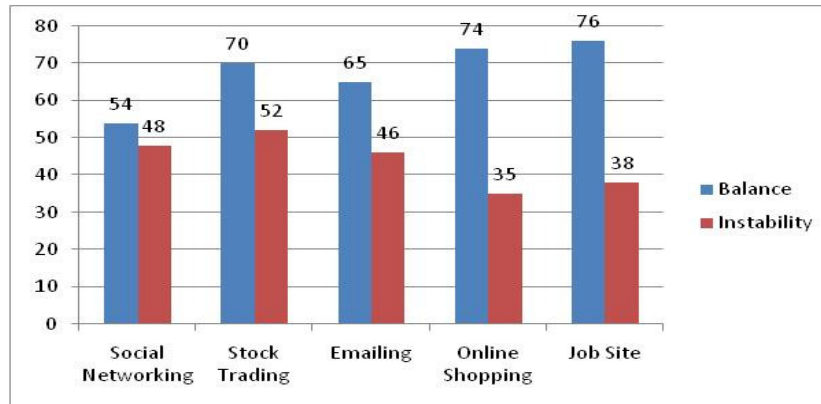
FIGURE 2: Balance & Instability.

4.2 Symmetry

Symmetry is axial duplication; a unit on one side of the centerline is exactly replicated on the other side [3]. The opposite of Symmetry is Asymmetry. The symmetry brings compactness and Asymmetry lacks compactness in the user interface.
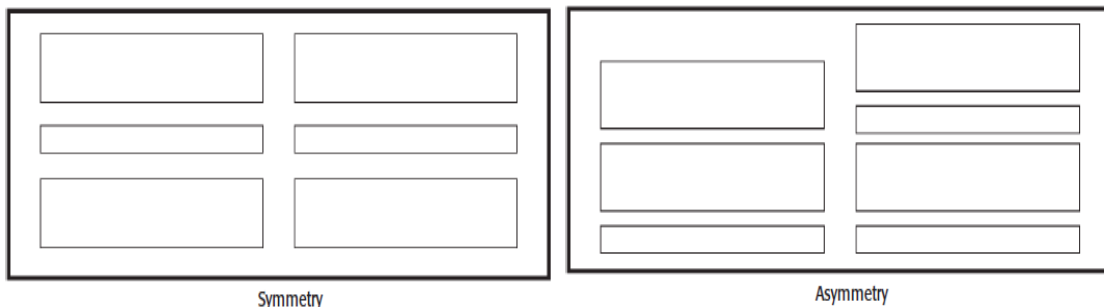
FIGURE 3: Symmetry & Asymmetry

The graph in the figure 4 below provides information about the number of perceived instances of symmetry (& asymmetry) in the five different web user interfaces investigated. For social networking and stock trading web pages, symmetry and asymmetry seems to coexist where as in the other three categories a significance of symmetry is clearly observable.
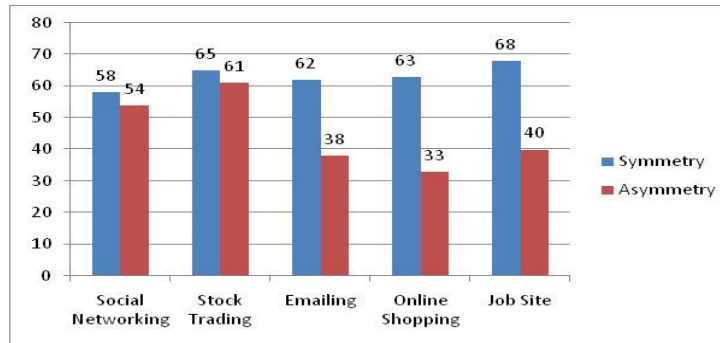

FIGURE 4: Symmetry & Asymmetry

4.3 Regularity

Galitz [3] says Regularity as a uniformity of elements based on some principle or plan. And it can be achieved by establishing standard, consistently spaced horizontal and vertical alignment points. Regularity can also be placed into the screen by using elements or controls of similar size, shape, color and spacing. The reverse of Regularity is Irregularity and is shown in figure 5 below.
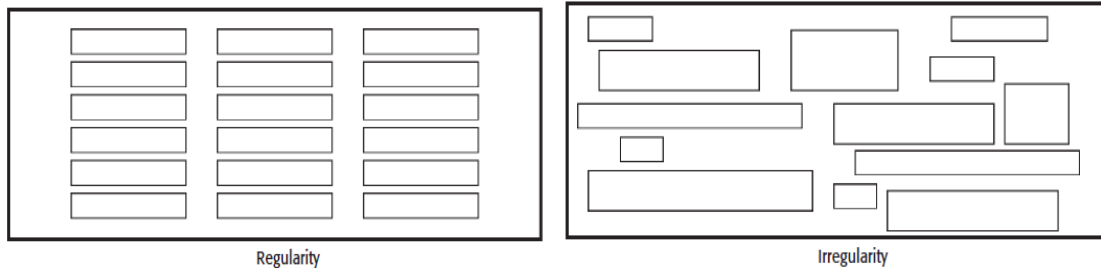
FIGURE 5: Regularity & Irregularity

While studying/investing regularity & irregularity in the five different types of web user interfaces, the students have identified their presence; whose instances of perceived existence are shown in the graph of figure 6 below. Regularity took very high precedence in all the five categories of web sites investigated and peaked in job site user interfaces. Regularity is perceived to be less in social networking interfaces and this may be due to various layouts coming everyday into the design domain of this category.
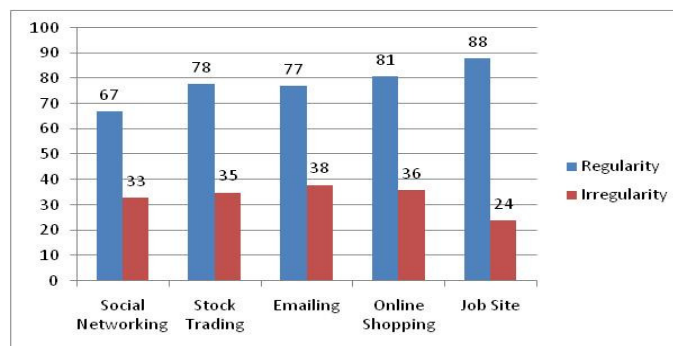

FIGURE 6: Regularity & Irregularity.

4.4 Predictability

As said by Galitz [3], predictability suggests a highly conventional order or plan. When user views one screen he/she could predict how another will look like. Also, viewing a part of screen, the user could easily predict how the rest of the screen looks like. The opposite of predictability is Spontaneity, having no plan or structure for the elements arranged on the user screen.
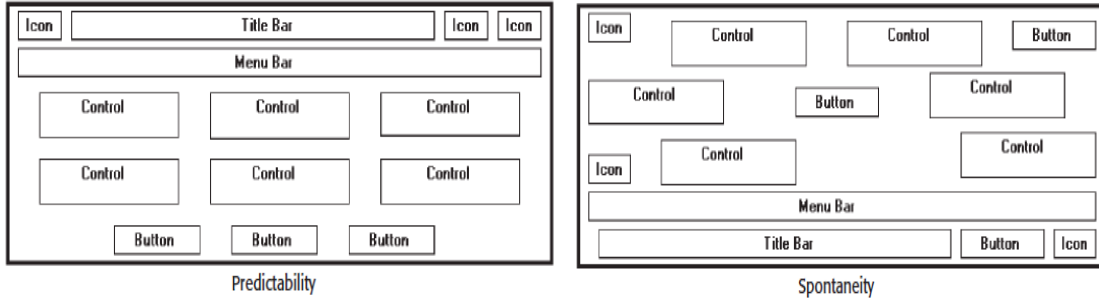

FIGURE 7: Predictability & spontaneity.

The graph in the figure 8 below displays number of instances of perceived existence of predictability in the five categories of web site user interfaces investigated. Predictability stood high in stock trading user interfaces when compared to other four types. The other four too have high presence of predictability in their interface layouts. Spontaneity is at moderate levels in stock trading and online shopping user interfaces and this seems to be due to clash between user's expected content and actual content presented, which will exist in both these types due to their high dynamic nature of the content.
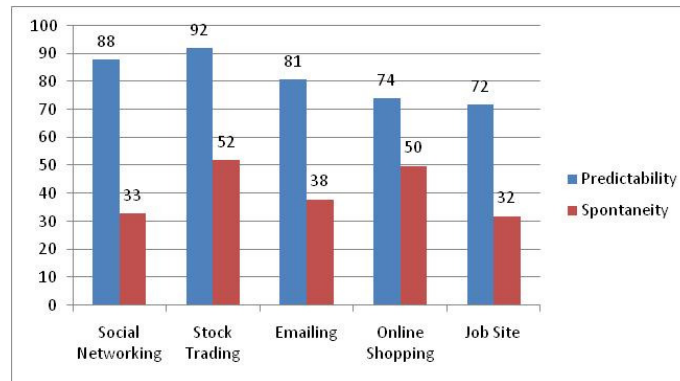

FIGURE 8: Predictability & Spontaneity.

4.5 Sequentiality

In the words of Galitz [3], sequentiality is a plan of presentation to guide the eye through the screen in a logical, rhythmic order, with the most important information significantly placed. The opposite of sequentiality is randomness which is highly undesirable to present to the user.
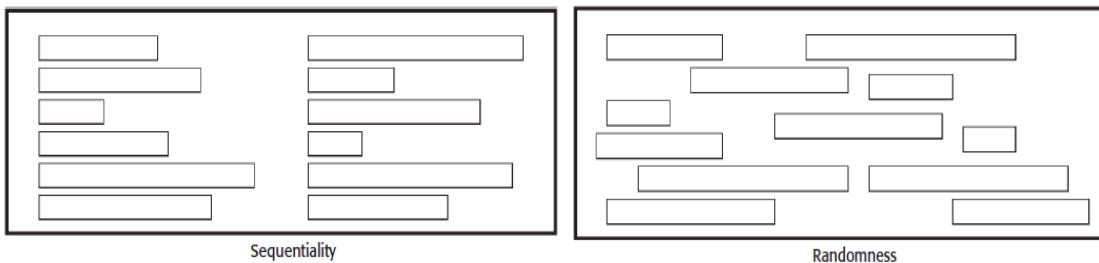

FIGURE 9: Sequentility & Randomness.

In the five different types of web user interfaces investigated by the students, existence of sequentiality is identified. The instances of perceived existence are shown in the graph of the figure 10 below. A high value of Sequentiality is found for social networking web user interfaces when compared to the other four categories. Users still felt presence of Randomness in few of the investigated web pages and a high value of it is goes for job site user interfaces.
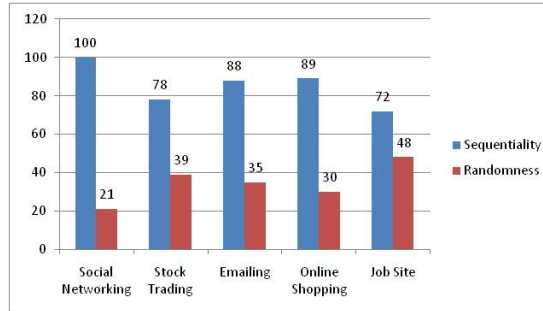

FIGURE 10: Sequentially & Randomness.

4.6 Economy
When it comes to displaying elements on the screen, the UI designer has many choices before him. But the usage of many different choices will degrade the users' visual appeal. In the words of Galitz [3], economy is the frugal and judicious use of display elements to get the message across as simple as possible. The opposite is intricacy, the use of many elements just because they exist.
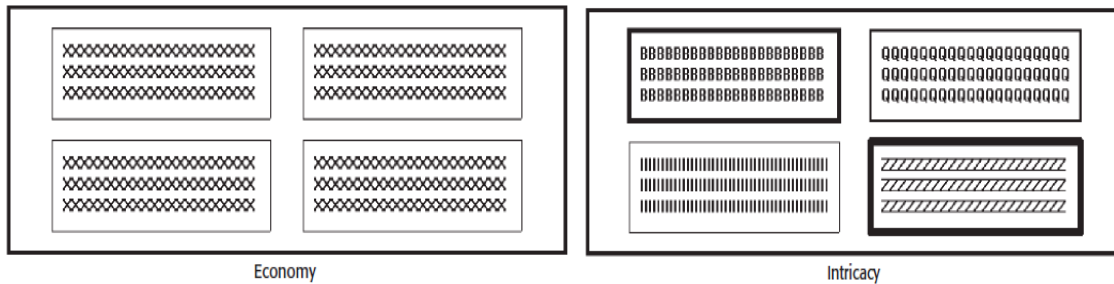

FIGURE 11: Economy & Intricacy.

For the investigated five various categories of web site user interfaces, the number of instances perceived for economy and intricacy are shown in the graph of figure 12 below. Economy dominates the presence and has significant difference with intricacy. Intricacy has been found more in stock trading web user interfaces and this may be due to the functional requirements specific to such type of user interfaces to show the various data properties or element properties being displayed on the screen.
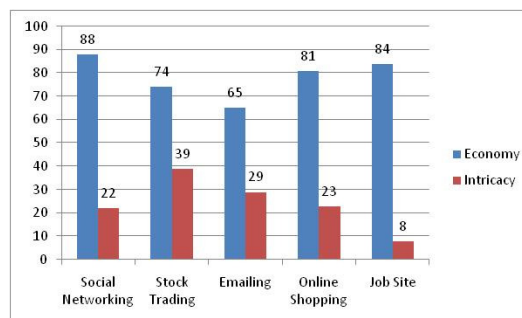

FIGURE 12: Economy & Intricacy.

4.7 Unity

When the elements of the screen are scattered in different directions, the visual appeal goes down and the user gets demotivated to use such interfaces. In the words of Galitz [3], Unity is coherence, a totality of elements that is visually all one piece .With unity; the elements seem to belong together. The opposite of Unity is fragmentation, each piece having its own character. Similar sizes, shapes, colors, promote unity, as does white space and borders at the display boundaries.
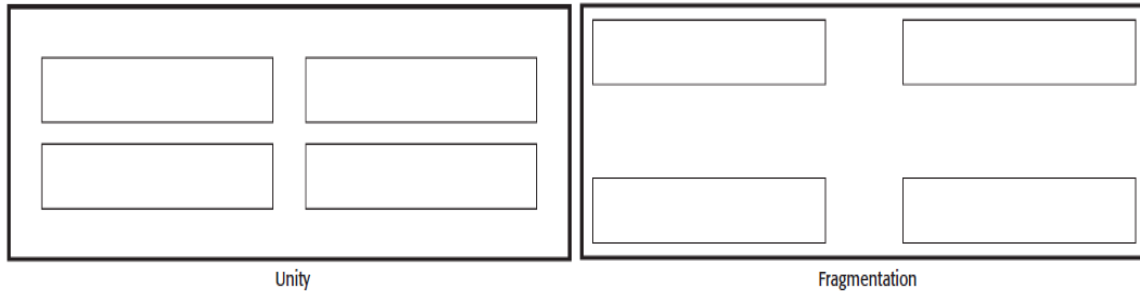

FIGURE 13: Unity & Fragmentation

While identifying unity among the five different web users interfaces investigated, the following (figure 14) number of perceived instances came to light. Clearly unity dominates the show in all the five cases. Fragmentation still seems to be present moderately in few of the web user interfaces and more in online shopping web user interfaces. This may be due to the users' lack of ability to distinguish between unity and fragmentation for online shopping user interfaces as they have elements crowded when compared to other categories. The same holds good for stock trading user interfaces as they are also more crowded with elements on the user screen.
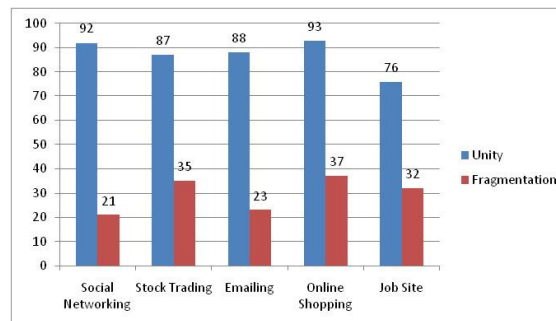

FIGURE 14: Unity & Fragmentation.

5. PLEASING PROPORTIONS

For the elements of the screen, to select their size proportions is a challenge for the UI designer. Since some proportions may be interesting to some users and not for others. Marcus [4] describes the following shapes as aesthetically pleasing proportions. These have stood the test of time and are commonly used.
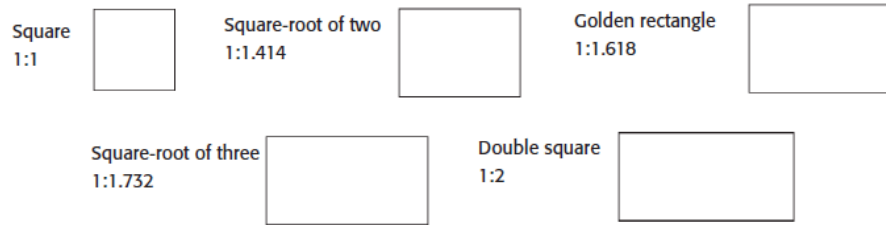
FIGURE 15: Pleasing Proportions.

In the case study involving five different categories of web interfaces, the number of instances of perceived presence of these five pleasing proportions is shown in the graph of figure 16 below.
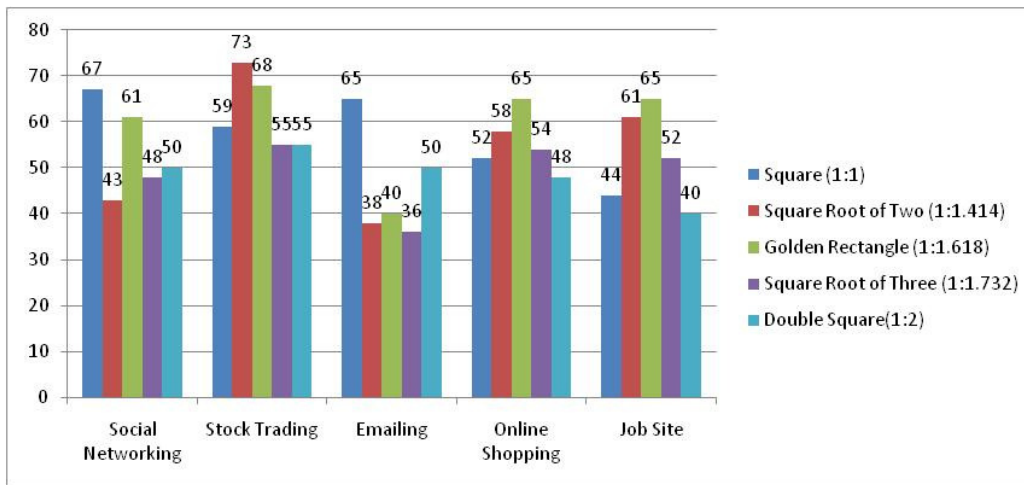

FIGURE 16: Pleasing Proportions.

Square dominated for social networking site user interfaces with Golden Rectangle following next. For trading sties, Square Root of Two took the top slot in terms of element proportion. Coming to email, it is again square proportion that took first place in presence. Golden Rectangle proportion has peaked top for online shopping and job site user interfaces.

6. CONCLUSION
The results presented in this paper show the presence of different visual techniques in varied and mixed forms. The variations are bound to surface as the functionalities of the web user interfaces investigated are different and pose a major constraint for UI designers implementing these standard visual techniques. The variations naturally come out due to the variation in users understanding levels of these techniques. Even though there are variations, the positive sides of these visual techniques and their presence is clearly felt in all the five categories of web user interfaces investigated, highlighting their validity even for the current times of great changes and advancements.

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