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Interface Design Factors Impact on Core Affect

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Abstract
Design factors considered to be critical in the field of human-computer interaction. However, empirical results in this area are inconsistent, and an overall synthesis across the numerous empirical studies seems lacking. The main objective of this study is to find the most important design factors that attract users, predict affective design, and develop a model that enables the evaluation of design factors along with the core affect. The main finding of this study is that design factors varies in their impact on core affect, where the empirical evidence supports the impact of text's font-size, menu direction, fore-color have on users core affect, the other design factors including menu location and alignment, back-color, icons type and size, and font type and alignment doesn't have significant impact. Therefore the study adds to the literature on design factors that needs more emphasis.

Keywords: design factors, graphical objects, core affect, emotions, human-computer interaction

INTRODUCTION

Global Building the human-computer interface requires high development efforts. Where developers are under increasing pressure to justify their work, and contribute in decreasing development costs. Therefore, there is a need for more researches to find solutions for several aspects of computer interfaces. The current study will focus on some design factors, and experiment the best fit of those factors with the user. User-computer interface consists of operating system commands, graphical objects, design factors, formats, and other medium provided by computers and program to facilitate using computer applications. Therefore design factors considered to be critical in the field of human-computer interaction. However, empirical results in this area are inconsistent, and an overall synthesis across the numerous empirical studies seems lacking.

The main objective of this study is to find the most important design factors that attracts users, predict affective design, find the most suitable model for representing the relation between the user and Interface component, how design factor affects affective impression, find the relationship between affective impression and core affect, find the relationship between design factors and affective impression, and integrating the results with the prior researches in this area. During this study a comprehensive model will be developed in order to enable the evaluation of design factors along with the core affect and affective impression, therefore this study addresses the following questions:

1. What are the most important design factors that attract users?
2. What is the most suitable model for representing the relation between the user and interface components?
3. What is the relationship between the design factors and core affect?

To pursue these questions, a comprehensive model was developed in this study, including the design factors, and core affect, after that an application followed by empirical study held to examine the developed model.

THEORETICAL FRAMEWORK

The General Model

The general model is presented (Figure 1) to identify the relationship between design factors as dependent variable and core affect as an independent variable.

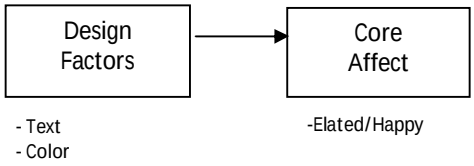


Figure1. The General Model

Design Factors

Design factors are all elements within the interface, where prior research uses set of design factors, mainly; diverse media, text, resolution, metaphors, color, menus, icons, buttons, toolbars, palettes, shape, and dialog boxes (Te'eni et al, 2007; Kim et al, 2003). This study will focus on the most important design factors which may have direct impact on user's core affect. Therefore, a survey was conducted, and data was collected from 60 experts including; end users,

and developers. The results support using color, text, icons, and menus as crucial design factors.

Color

Color is an important element in graphical design if it is carefully selected taking into consideration color deficits. RNIB (2004) recommends that no more than five colors should be used in any display. Redundancy should enable the controls to be inferred through other means that would benefit people with decreased color perception.

Arditi (2010) lists three rules for effective color selections, which are:

1. Exaggerate lightness differences between foreground and background colors.
2. Choose dark colors with hues from the bottom half of the hue circle against light colors from the top half of the circle.
3. Avoid contrasting hues from adjacent parts of the hue circle, especially if the colors do not contrast sharply in lightness.

More ever, the loss of sensitivity to blue means that warm colors are distinguished easily, and to better see cool colors, they need to be brighter or more saturated to improve contrast (Eiseman, 2000). Using color in effective way can enhance communication and aesthetics of an application, and contributes to user satisfaction. Color should integrate well with other elements in the design, and should maintain relationships between different elements as part of one unit (Cooper, 2003).

The present study will track the user while customizing colors on a proposed interface during an experiment; those colors will appear on specified labels, texts, and buttons, then store the results in a separate file.

Text

Most of presented information in an interface is textual; therefore, the right text treatment can measurably improve user productivity and increase user satisfaction. A good foundation of knowledge about effective text treatment can help designers create usable user interfaces for them more quickly (Komischke, 2009). The most important aspects of text can be classifies into font type, letter case, text orientation, and font size, and text alignment.

The present study will track the user while customizing text on a proposed interface during an experiment; text will appear on specified labels, textboxes, and buttons, then store the results in a separate file.

Icons

An icon is a sign (word or graphic symbol) whose form suggests its meaning. On a computer screen, an icon is any graphical representation which refers to an object or an action that can be performed (Rossi and Querrioux, 1997). Icons are more powerful representations that allow immediate recognition, increase the speed at which users find objects on the screen, and in some cases conserve screen space when representing objects or actions (Rossi and Querrioux, 1997). Furthermore, there are some objects that cannot be represented in textual form such as pictures (Tullis, 1988). Icons are not necessarily the best way to represent data, however. Rossi and Querrioux (1997) suggested that the relationship between an icon and its meaning should be automatically and consequently independent of any learning. This means that for an icon to work better than another representation (such as a textual description), it needs to evoke implicit understanding of the meaning of the icon. Yamakawa et al (1997) Found that the icons that worked best are those that most concretely represented the object or action and were most visually.

The present study will track the user while customizing icons on a proposed interface during an experiment; those icons will appear in a textual form, image form, and mixed form on the interface, then store the user selection in a separate file.

Menus

A menu is a group of visually similar words and/or icons on a computer screen that allows the user to select an action to be performed. Menus have the advantage that users do not have to remember the item they want; they only need to recognize it (Preece, 1994). Mills & Prime (1990) finds that for menus with few items, circular menus are the most efficient form, where all of the menu items are equidistant from the center of the circle. Furthermore, subjects performed much better with static menus than they did with moving menus, where the cursor selecting the menu item stays at a certain location on menu moves up and down as the subject moves by the mouse. This result might be attributable to the increased memory requirements that are needed to traverse moving menus, not only must the subject perform the entity match discussed above, but they also must keep track of which menu items are both above and below the cursor.

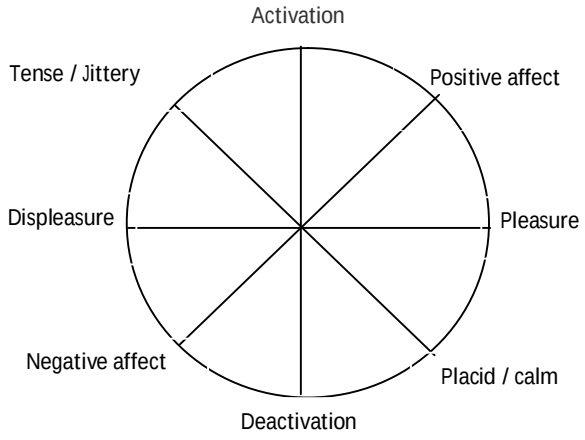
The order of menu items within a menu is also a factor in how subjects perform, and can point to certain memory and visual constraints. If a user already knows the menu item to select; which would mean that the task solely involves searching, alphabetically arranged menus work best. .In the case that a user is either unfamiliar with the menu structure, or is not sure of the mapping of menu item to action, then functional organization; which groups menu items that perform similar actions within the same menu, and gives the menu a descriptive title—allows subjects to be most efficient (Mehlenbacher et al, 1989).

The present study will track the user while customizing a menu on a proposed interface during an experiment; actions will include menu direction, alignment, icon size, and location, and then store the results in a separate file.

Core affect

Affect is generally used to refer to any state that represents how an object or situation impacts a person (Duncan and Barrett, 2007), Where affect can be used to encompass mood, emotions, and feelings (Li and Zhang, 2005). The term core affect can be defined as a neuro physiological state that is consciously accessible as a simple, non-reflective feeling that is an integral blend of hedonic (pleasure-displeasure), and arousal (sleepy – activated) (Russell, 2003). Where Pleasure-displeasure refers to the extent to which one is generally feeling good or bad, and arousal refers to the extent to which one is feeling engaged or energized values. Core affect consciously accessible as the simplest raw feelings evident in moods and emotions, this situation is called activation (Thayer, 1989). At a given moment, the conscious raw feeling considered as a single integral blend of two dimensions, which are pleasure-displeasure, and arousal.

Figure 2 represents those two dimensions, where pleasure-displeasure formulates the horizontal dimension; this dimension ranges from extreme, through a neutral point to its opposite extreme. The vertical dimension; arousal, ranges from sleep through various stages to frenetic excitement. Russell (1989) provides the Affect Grid, designed as a quick means of assessing affect along the dimensions of pleasure-displeasure, and arousal-sleepiness. The grid was designed to record judgment about single instance, and average intensity of affect.



Pleasure and arousal are considered to be the two dimensions, where displeasure considered the opposite of pleasure, and sleepiness considered the opposite to arousal.

Depending on those findings and clarifications, the present study will measure core affect two times by giving the user of the proposed interface a random mix of design factors, then allow him to make any changes in this interface. During this process two constructs will be used to measure core affect. First construct composed of six Likert-scale items, mainly beautiful, hopeful, pleased, fun, elated, and happy. Second construct also composed of six Likert scale items which are interactivity, tense, activation, creative, sad, and gloomy.

RESEARCH MODEL AND HYPOTHESIS

A change in core affect evokes a search for its cause and therefore facilitates attention to accessibility of like-valenced material, thus core affect guides cognitive processing. Where the more positive core affect, the more positive events encountered or remembered or envisioned (Schwarz and Clore, 1983). In their review to many researches (Duncan and Barrett, 2007) found that core affect is a neurophysiologic barometer of the individual's relationship to an environment at a given point in time. To the extent that an object or event changes a person's ''internal milieu'' it can be said to have affective meaning, these changes are what we mean when we say that a person has an affective reaction to an object or stimulus. They are the means by which information about the external world is translated into an internal code or representations.

Interface considered as an environment to the user, therefore icons, and menus are important design factors that may influence the user's core affect. To test this expected relationship, the following hypothesis will take place:

H1: Menus positively influence core affect.

This hypothesis can be subdivided into two sub hypothesis as follow:

H1-1: Menus positively influence pleasure.

H1-2: Menus positively influence activation.

The same for icons, the following hypothesis can take place:

H2: Icons positively influence core affect.

This hypothesis can be subdivided into two sub hypothesis as follow:

H2-1: Icons positively influence pleasure.

H2-2: Icons positively influence activation.

There seems to be various implied relationships between aesthetics and affect that scholars have established in studies on either aesthetics or emotional design. Therefore Zhang [24] anchors aesthetics to a fundamental human aspect, affect, and treats aesthetics as means to reaching a higher goal of desirable affective states. Accordingly, color considered as the most important design factor that effect aesthetics, thus influencing core affect.

Therefore, the expected relation of color to core affect will be tested using the following hypothesis:

H3: Color positively influence core affect.
Where core affect tested using two major constructs, therefore H3 can be subdivided in to the following two sub hypothesis:
H3-1: Color positively influences pleasure.
H3-2: Color positively influences activation.
Li and Zhang [9] reviews many researches and finds that affect encompasses mood, emotions, and feelings, is a fundamental aspect of human beings, one that influences reflex, perception, cognition, and behavior studies in organizational behavior, marketing, and management have confirmed the strong impact of affect on job satisfaction, decision-making behavior, and consumer shopping behavior. Affective quality is the ability of an object or stimulus to cause changes in one's affect. Essentially, pleasing things work better, are more regularly used, are easier to learn, influence future purchase choices, and produce a more harmonious result. Thus affect and emotion have an important place in design; usability and aesthetics are both instrumental in creating pleasurable electronic products.
Accordingly, the following hypotheses is proposed to test the relationship between text on the interface and core affect of the user:

H4: *Text positively influence core affect.*
Where core affect tested using two major constructs, therefore H4 can be subdivided in to the following two sub hypothesis:
H4-1: Text positively influences pleasure.
H4-2: Text positively influences activation.
Figure 3 represents the research model, which incorporates design factors as dependent variables, and core affect as an independent variable. Thus the model includes six constructs, four constructs of the design factors which menus, icons, color, and text. In addition to other two constructs of the core affect which are pleasure-displeasure, and activated-deactivated.

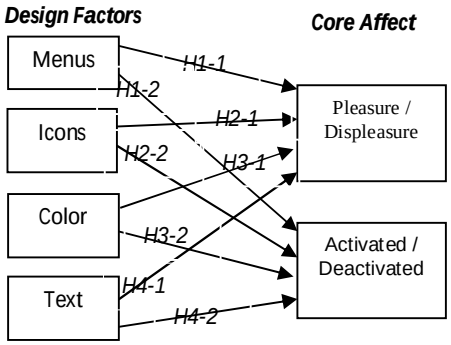


Figure3. The study model

METHODOLOGY

Experiment Design

To test the study hypothesis, a prototype was developed, and an experiment was held to check out how the user customizes the interface in a way that suits his core affect. The proposed prototype includes those design factors included in this study; which are menus, icons, color, and text, and a tracking tool that detects any change the user do during the customization process. After that the user have to respond to an on line questionnaire that includes a Likert scale items (table1) about user core affect.

Table1. Core Affect Measures

Core Affect Dimensions	Items
Pleasure/ Displeasure	The new interface characterized with: 1. Beautiful 2. Hopeful 3. Pleases 4. Fun 5. Elated 6. Happy
Activated/ Deactivated	The new interface characterized with: 1. Interactivity 2. Tense 3. Activation 4. Creative 5. Sad 6. Gloomy

Menu Customization

The main properties included in menu testing are: direction, alignment, and location of the menu (Figure4).

Figure4. Menu customization.

Text Customization

The main properties included in text testing are: font, font size, foreground, and background color (Figure 5).

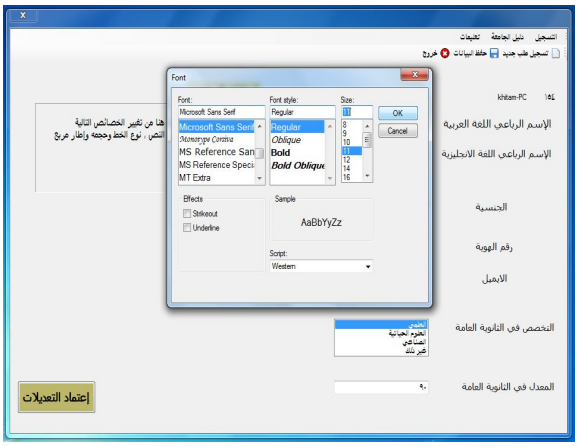


Figure 5. Text Customization

Color Customization

During the experiment a tracking tool will follow up the user while customizing colors on labels, texts, and buttons, then store the results in a separate file (Figure6).

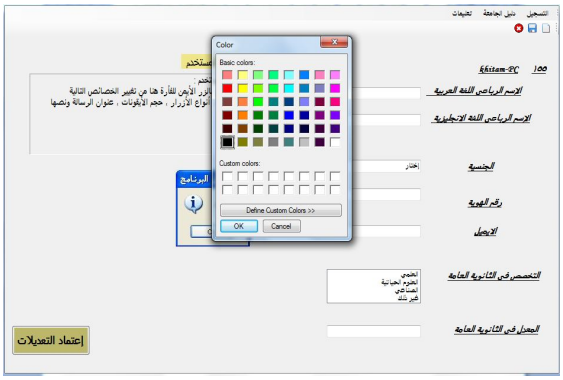


Figure6. Color customization

Icons Customization

The main properties included in icons customization are: images, text, or mixed (Figure7).

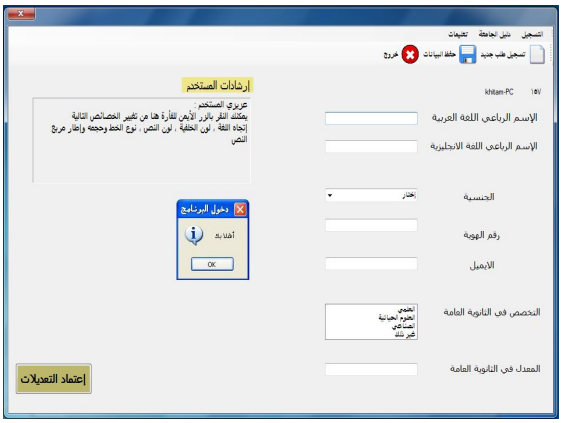


Figure7. Icons customization

RESEARCH DESIGN

Sample

The unit of analysis in this experiment is the undergraduate students, whom specialized in computing. 300 respondents participated in the experiment, out of the 300 experiments, 227 succeeds in producing the required data (71% response rate).

DATA ANALYSIS AND RESULTS

This section reports the results of the research experiment, using a variety of statistical methods for data analysis. The data collected from the experiment shows important features related to interface design.

Menus Characteristics

Table (2) provides a summary of the preferred menu characteristics to the interface users. Where 57.5% of respondents prefer the menu location to be at the top of the interface screen, 74.0% prefers horizontal menus and 59.9% prefers a right to left menu text alignment.

Table2. Menu Characteristics

	Frequency	Percent %
Menu location at the computer screen		
Top	131	57.7
Left	42	18.5
Bottom	33	14.5
Right	21	9.3
Menu direction		
Horizontal	168	74.0
Vertical 90	28	12.3
Vertical 270	30	13.2
Menu-text alignment		
Left to right	70	30.8
Right to left	136	59.9
Center	21	9.3

Icons Characteristics

Table (3) shows the preferred icon characteristics to the interface users. Where 55.9% of respondents prefer mixed icons that contain both an image and a text accompanying the image, and 55.9% prefers medium size icons.

Table3. Icons Characteristics

	Frequency	Percent %
Icon type		
Image	61	26.9
Text	39	17.2
Mixed	127	55.9
Icon size		
Small 16*16	62	27.3
Medium 24*24	127	55.9
Large 36*36	38	17.8

Color Characteristics

Interface colors classified as an important design factor on the interface. Table (4) shows that 80.2% of the experiment respondents prefer the white background color, and 56.8% prefer the black fore-

color. This means that some respondents prefer other foregrounds on the white background color.

Table4. Colors Characteristics

	Frequency	Percent %
Background color		
Black	17	7.5
White	182	80.2
Green	16	7.0
Red	6	2.6
Mixed	6	2.6
Foreground		
Black	129	56.8
White	14	6.2
Green	8	3.5
Red	5	2.2
Mixed	71	31.3

Text Characteristics

Table (5) shows the preferred icon characteristics to the interface users. Where 24.2% of respondents prefer times new roman font, 15.4% prefer Arial, and 10.1% prefer Microsoft sans serif. The same results shows that 33.9% prefer the font size to be 14, and 33% prefer font size to be 12. While 60.4% of respondents prefer text alignment to be right to left. This means that most respondents prefer Arabic interface.

Core Affect Specifications

Core affect was measured using many items as shown in table (6) using a 5 points Likert scale; where 1: means strongly agree, 2: agree, 3: neutral, 4: disagree, 5: strongly disagree. Pleasure-displeasure took a degree of 1.97 at Likert scale; this value means that user's core affect is positive using the design factors characteristics in the above sections. Where activated- deactivated took the degree of 2.11 at the same scale which also means positive impact of the design factors used in this research.

Figure (8) depicts the results of the experiment concerned with the core affect. The figure shows that the user's core affect may be at any point of the shadowed area in the diagram depending on the characteristics of the design factors tested in this study.

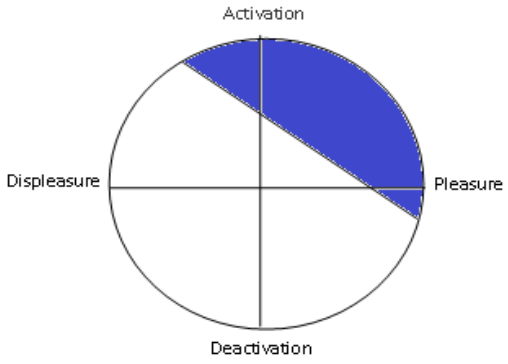


Figure 8: Interface User's Core Affect

Table5. Text Characteristics

	Frequency	Percent
Font type		
Andalus	15	6.6
Arabic Typesetting	11	4.8
Arial	35	15.4
Arial Black	17	7.5
Book Antique	10	4.4
Cambria	7	3.1
Candara	4	1.8
Consolas	4	1.8
Corbel	8	3.5
Dotum	4	1.8
Estrangelo Edessa	14	6.2
Malgun Gothic	2	0.9
Microsoft Sans Serif	23	10.1
Segeo Print	8	3.5
Tahoma	7	3.1
Times New Roman	55	24.2
Webdings	2	0.9
Total	227	100
Font size		
8	3	1.3
9	4	1.8
10	10	4.4
11	1	0.4
12	75	33.0
13	2	0.9
14	77	33.9
16	37	16.3
18	15	6.6
20	3	1.3
Total	227	100
Text alignment		
Left to right	66	29.1
Right to left	137	60.4
Center	24	10.5
Total	227	100

Table6. Core Affect Characteristics

Core Affect Dimensions	Items	Mean	St.Deviation
Pleasure/ Displeasure	1. Beautiful	1.85	0.865
	2. Hopeful	1.96	0.884
	3. Pleased	1.91	0.801
	4. Fun	2.06	0.943
	5. Elated	1.89	0.837
	6. Happy	2.01	0.919
	Pleasure	*1.9471*	*0.596*
Activated/ Deactivated	1. Interactivity	2.11	.981
	2. Activation	2.07	0.919
	3. Creative	2.13	0.959
	Activated	*2.1*	*0.721*

RELIABILITY AND VALIDITY

Data collected from the research experiment can be divided into two main types; first: data collected from tracking the changes made by the interface users during the execution of this interface, second: data collected from the users using a questionnaire that follows the experiment. The questionnaire was composed to measure the respondent's core affect. Where two constructs were established; first construct was established to measure the user pleasure-displeasure using a six Likert scale items; mainly beautiful, hopeful, pleased, fun, elated, and happy. Second construct was established to measure the user activation-deactivation using a six Likert scale items which are interactivity, tense, activation, creative, sad, and gloomy.

To ensure the reliability of the constructs used, a reliability analysis was conducted on the data. The criteria given by Nunally (1978) that an alpha reliability 0.7 or more is considered an adequate reliability coefficient was applied to determine the adequacy and the reliability coefficient obtained for each construct.

To ensure the validity of the constructs used, a factor analysis was conducted on the data. The recommended guidelines by (Hair et al, 1998) were used to determine the relative importance and significance of the factor loading of each item in the construct. Thus loading factor greater than 0.3 is considered significant, loading 0.4 is more important and loading of 0.5 or greater is considered as very significant.

Pleasure-Displeasure

Table (7) shows the results of the internal consistency reliability analysis of the please-displeasure measure. To the extent that an item measures the same thing as the total score does, to this extent the item is valid. The results indicate that all the six items are significantly correlated with the total item and that the alpha reliability will not improve if any of the items is deleted.

Table7. Reliability analysis of pleasure-displeasure items

Pleasure-Displeasure Items	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Beautiful	.441	.752
Hopeful	.522	.731
Pleased	.502	.737
Fun	.495	.739
Elated	.574	.719
Happy	.543	.726
Cronbach's Alpha .768		

Table (8) depicts the results of the factor analysis used to test the construct validity of the pleasure-displeasure measure. The results show that the six items of please-displeasure fall under on dimension with loading exceeding 0.5. Thus the measure was able to demonstrate level of construct validity.

Table8. Component matrix of pleasure-displeasure measure

	Loading
	Component 1
Beautiful	.609
Hopeful	.694
Pleased	.670
Fun	.666
Elated	.738
Happy	.710

Extraction Method: Principal Component Analysis.
a 1 components extracted.

Activation-Deactivation

Several reliability and components matrix tests were made to the activation-deactivation measure. The initial result shows that the activation-deactivation measure items must reduced in order to be reliable and valid. Those tests provide tables (9), and (10).
Table (9) shows the results of the internal consistency reliability analysis of the activation-deactivation measure. To the extent that an item measures the same thing as the total score does, to this extent the item is valid. The results indicate that all the three items are significantly correlated with the total item and that the alpha reliability will not improve if any of the items is deleted.

Table (10) depicts the results of the factor analysis used to test the construct validity of the activation-deactivation measure. The results show that the three items of the construct fall under on dimension with loading exceeding 0.5. Thus the measure was able to demonstrate level of construct validity.

Table9. Second round of reliability analysis of activation-deactivation items

Activation-Deactivation Items	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted T
Interactivity	.527	.641
Creatvie	.542	.618
Activation	.537	.626
Cronbach's Alpha: .732		

Table10. Component matrix of activation-deactivation measure

Activation-deactivation items	Component
	1
Interactivity	.748
Activation	.759
Creative	.763

Extraction Method: Principal Component Analysis.
a 1 components extracted.

Hypothesis Testing

Hypothesis H1-1 suggests that Menus positively influence pleasure. The results of Pearson correlation "r" (table 11) show that there is a positive relationship between all menu items and pleasure, but the results are not significant (P > 0.05) for all items. This implies that the results doesn't support H1-1, therefore menus cannot considered an important factor that influences pleasure.

Table11. Regression Analysis of Independent Variables on Pleasure-Displeasure

Independent Variables		R	R Square	Unstandardized Coefficients		Standardized Coefficient	Sig
				B	Std. Error	Beta	Std. Error
Menu	Location	.038	.001	.022	.039	.038	.569
	Direction	.113	.013	-0.095	.056	-.113	.091
	Alignment	.036	.001	-.036	.067	-.036	.586
Icon	Type	.090	.008	.062	.046	.090	.176
	Size	.021	.000	.010	.031	.021	.751
Color	Backgroun d color	.019	.000	-.017	.058	-.019	.771
	Foreground	.121	.015	-.040	.022	-.121	.068
Text	Font Type	.028	.001	-.003	.007	-.028	.673
	Font Size	.142	.020	.046	.021	.142	.032
	Alignment	.046	.002	-.043	.063	-.046	.489

Table12. Regression Analysis of Independent Variables on Activation-Deactivation

Independent Variables		R	R Square	Unstandardized Coefficients		Standardized Coefficient	Sig
				B	Std. Error	Beta	Std. Error
Menu	Location	.077	.006	.054	.047	.077	.249
	Direction	.205	.042	-.208	.066	-.205	.022
	Alignment	.006	.000	-.008	.081	-.006	.923
Icon	Type	.046	.002	.039	.056	.046	.486
	Size	.030	.001	-.017	.037	-.030	.650
Color	Backgroun d color	.018	.000	-.018	.070	-.018	.792
	Foreground	.200	.040	-.079	.026	-.200	.002
Text	Font Type	.015	.000	.002	.009	.015	.819
	Font Size	.147	.022	.057	.026	.147	.027
	Alignment	.033	.001	.038	.076	.033	.618

Hypothesis H1-2 suggests that Menus positively influence activation. The results of Pearson correlation "r" (table 12) show that there is a positive relationship between all menu items and activation, and this result is significant for the menu direction (P<0.05), while the results are not significant (P > 0.05) for all other items. This implies that the results partially support H1-2; therefore menu direction effects activation, where the other menu dimensions cannot be considered important factors that influence activation.

Hypothesis H2-1: Icons positively influence pleasure. The results of Pearson correlation "r" (table 11) show that there is a positive relationship between icons items and pleasure, but the results are not significant (P > 0.05) for all items. This implies that the results doesn't support H2-1, therefore icons cannot considered important factor that influences pleasure.

Hypothesis H2-2 suggests that icons positively influence activation. The results of Pearson correlation "r" (table 12) show that there is a positive relationship between all icon items and activation, but the results are not significant (P > 0.05) for all items. This implies that the results doesn't support H1-2, therefore icons cannot considered important factors that influences activation.

Hypothesis H3-1 suggests that color positively influence pleasure. The results of Pearson correlation "r" (table 11) show that there is a positive relationship between all menu items and pleasure, but the results are not significant (P > 0.05) for all items. This implies that the results doesn't support H3-1, therefore cannot considered an important factor that influences pleasure.

Hypothesis H3-2 suggests that color positively influence activation. The results of Pearson correlation "r" (table 12) show that there is a positive relationship between all color items and activation, and this result is significant for foreground item (P<0.05), while the results are not significant (P > 0.05) for all other items. This implies that the results partially support H3-2; therefore fore-color effects activation, where the other color dimensions cannot be considered important factors that influence activation.

Hypothesis H4-1 suggests that text positively influence pleasure. The results of Pearson correlation "r" (table 11) show that there is a positive relationship between all menu items and pleasure, where this result is significant for font size (p<.05>, while it's not significant (P > 0.05) for the other items. This

implies that the results partially support H4-1; therefore text's font size affects pleasure, where the other text dimensions cannot be considered important factors that influence pleasure.

Hypothesis H4-2 suggests that text positively influence activation. The results of Pearson correlation "r" (table 12) show that there is a positive relationship between all text items and activation, and this result is significant for text's font size ($P<0.05$), while the results are not significant ($P > 0.05$) for all other text dimensions. This implies that the results partially support H4-2; therefore font size effects activation, where the other text dimensions cannot be considered important factors that influence activation.

DISCUSSION

The research model of this study was designed to investigate the possible impact of menus, icons, color, and text on user's core affect. The data analysis partially supports the hypothesized relationships between independent variables and dependent variables in the research model. Menu direction was found to positively influence core affect, mainly activation. This finding of a positive impact of the menu direction is consistent with the findings of (Duncan and Barrett, 2007), where they found that core affect is a neurophysiologic barometer of the individual's relationship to an environment at a given point in time. Menu can be considered as an environmental factor, therefore the findings of this study extends the prior findings that concerns with the environmental impact on core affect. Text color and font size, where considered as part of aesthetics that can be found on the interface. The findings of this study show that fore-color, font size, are positively influences core affect for both pleasure and activation. Those findings of positive impact are consistent with the finding of (Zhang, 2009) who anchors aesthetics to a fundamental human aspect, affect, and treats aesthetics as means to reaching a higher goal of desirable affective states.

In addition, the current study finds many important characteristics related to design factors that can help designers in designing an interface that positively impact the core affect, those findings can be summarized as follow:

- End users prefer menu location to be at the top of the interface screen.
- Users prefer mixed icons that contain both an image and a text accompanying the image.
- Interface colors classified as an important design factor on the interface, where users prefer white background color, and black fore- color.
- The majority of users prefer times new roman font, and 12 font size.

CONCLUSION AND RECOMMENDATIONS

Researches in the area of human-computer interaction, tries to find aspects that influences the users core affect, mainly pleasure-displeasure, and activation-deactivation, therefore designers of computer interface can take into consideration. It was clear that design factors varies in their impact on core affect, where the empirical evidence supports the impact of text's font-size, menu direction, fore-color have on users core affect, the other design factors including menu location and alignment, back-color, icons type and size, and font type and alignment doesn't have significant impact. Therefore the study adds to the literature on design factors that needs more emphasis. Design factors, needs to be investigated in a context, such as top management support, organizational culture, facilitating conditions etc. those factors need to be investigated.

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