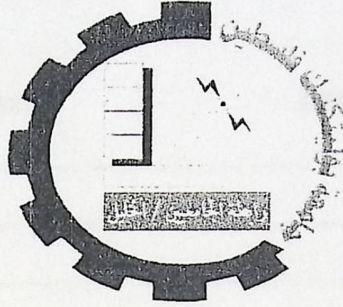


Palestine Polytechnic University

College of Administrative Science and Informatics

Department of Information Technology



The effects of design factors on affective impressions: Applied on Computing Students in Palestine Polytechnic University

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تم عمل التقرير بالاشتراك مع الزملاء

المسترف: اسماء رومي

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Supervisor: Inst. Ismail Romi

A final project submitted in partial fulfillment of requirements for the degree of B.Sc in Information Technology

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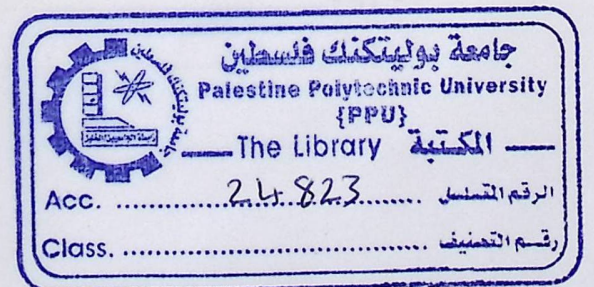


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Dedication

To the candle which lighted and guide us through darkness and frustrating moments;
to our parents ...

To all our brothers and sisters ...

To who granted us the tenderness and taught us the patience.... To our dear
supervisor Dr.Ismail Romi...

To our soul mates who supported us ... To those who are always there when we
need them ... to our friends

To our home Palestine ...

To all of these persons we would like to dedicate this project...

Project team

Acknowledgment

We would like to take this opportunity express our thanks to the college of administrative science and informatics

The team members advance deep thanks to their dear supervisor Dr. Ismail Romi who have granted us support, orientation, guidance, help and advice.

Our thanks and gratitude also go to every one who contributed to the success of the project from near or far and we don't forget our dear teachers, lectures, friends...

We can only say for their gratitude..

Thank you...

Abstract

Nowadays many designers meet a problem in determining what design factors they should focus on and take into account consideration when designing user interface. The objective of this project is to design an interface with selected design factors, where these factors were the field of our research and experiments.

We studied the relation between design factors, affective qualities, affective impressions and core affect in order to get deep understanding of the interface design.

We made a model which contains all factors that adapted from the literature review, and then we checked the user response to them by using a program to detect the user behavior during using the interface.

By doing this we will help in the prediction of affective design and also predict user and customer needs for affect.

المخلص

يواجه العديد من المصممين في الوقت الحاضر مشكلة في تحديد ما هي العوامل التي ينبغي التركيز عليها، وأخذها بعين الاعتبار عند تصميم واجهة المستخدم. وفي هذا المشروع نركز على عناصر التصميم التي تؤثر على الانطباع العاطفي، وأهميتها عند المستخدم، ومن ثم نركز على تصميم واجهة المستخدم الرسومية في تطبيقات سطح المكتب، ومواقع الإنترنت.

يهدف هذا المشروع إلى تصميم واجهة للمستخدم عن طريق توظيف عناصر تصميم محددة؛ حيث تشكل هذه العناصر وتأثيرها هما مجال أبحاثنا وتجاربنا، ودراسة العلاقة بين عناصر التصميم والعوامل المؤثرة عليها والمشاعر اتجاهها، وانطباع المستخدم عنها ومدى تأثيرها في نفسه، من أجل الوصول لفهم أعمق لهذه العناصر.

وذلك بتقديم النموذج الذي يحتوي أهم العناصر التي تم الوصول إليها من خلال استعراض الدراسات السابقة، وبعد ذلك تتم عملية متابعة سلوك المستخدم أثناء تعامله مع هذه الواجهة وذلك من خلال استخدام برنامج خاص.

نرجو أن نتمكن بهذا من مساعدة المصممين في التنبؤ بواجهة المستخدم المثلى والأفضل بناء على رغبات واهتمامات المستخدمين.

Chapter One

Introduction

- ◆ Introduction
- ◆ Study Problem
- ◆ Objectives
- ◆ Importance of this Project
- ◆ Study design

1.1 Introduction

User interface changes many people's lives. Effective user interface for professional means that children can learn more effectively and graphic experts can explore creative possibilities more fluidly.

Thus, nowadays many designers face a problem in determining what design factors they should focus on and take into account when designing.

This project broadly investigates design factors, affective quality, affective impression, core affect, and the importance of them. Additionally, it investigates issues associated with interaction design, and then focuses on the GUI design of desktop applications and websites.

Through producing a model which helps in explaining how and why users interact with computers and how this knowledge is relevant to the design, also try to produce a tool that evaluate the interface and predict of user behaviour when dealing with it.

1.2 Study Problem

Interface is a very important part of the human computer interaction, and it has a huge impact on the user who deals with it. Thus, if this interface is poorly designed, this will lead to many problems in using the interface. To avoid that, many questions appeared:

1. What are the most important design factors that attract users?
2. How could we predict affective design?
3. What is the most suitable model for representing the relation between the user and interface components?
4. How design factors affect affective impression?
5. What is the relationship between affective impression and core affect?
6. What is the relationship between design factors and affective impression?

1.3 Objectives

"Any project should have clear objectives. When you set a clear objective, you or your direct reports are able to focus attention and energy on a concrete aspirate

anything from a small task to a career ambition. When you set an objective, you send an image to your subconscious mind. It remains there until the objective becomes reality". (BNET Editorial, 2007).

So our objectives are:

1. To find the most important design factors that attracts users.
2. To predict affective design.
3. To find the most suitable model for representing the relation between the user and Interface component.
4. To know how design factor affects affective impression.
5. To find the relationship between affective impression and core affect.
6. To find the relationship between design factors and affective impression .

1.4 Importance of this Project:

The importance of our project comes from two integrated aspects:

1.4.1 Academic side

Integrate with previous studies.-

-Provide more understanding for design factors, affective qualities, affective impressions and core affects.

1.4.2 Practical side

Enable designers to build the interface taking into consideration the favorable design factors and their properties into consideration.

1.5 Study design

1.5.1 Theoretical Part

This part concerned with the previous studies and other related work to our project. All of this will be discussed in chapter 2.

1.5.1.1 Study Model

We try to make this model which is adapted from the literature review

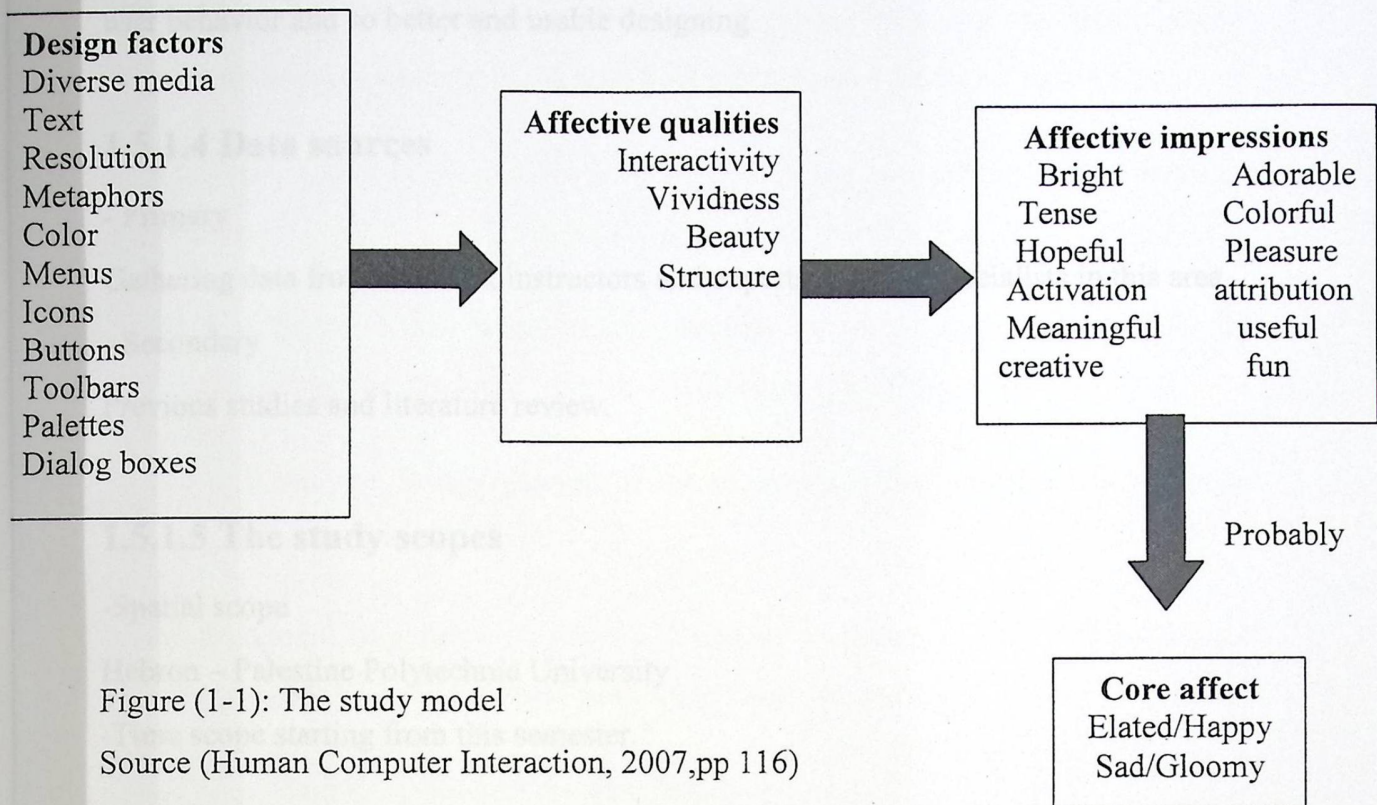


Figure (1-1): The study model

Source (Human Computer Interaction, 2007, pp 116)

1.5.1.2 Study variables

In our study we have two types of variables:

- Dependent Variables

Interactivity, Vividness Tense, Colorful, Hopeful, Pleasure, Beauty, Structure, Bright, Adorable, Activation, attribution Meaningful, useful creative, fun.

-Independent Variables

Diverse media, text, Resolution, Metaphors, color, menus, icons, buttons, toolbars, palettes, dialog boxes.

1.5.1.3 Hypotheses of the study

- Affective interfaces may be achieved by using good design factors and Affective qualities based on the model.
- Affective Impression may lead to the core Affect.
- Design within the noted physiological principles may be the best solution to make users satisfied and attracted to the interface.

- Navigate the user interaction with the interface may lead to better understanding of user behavior and so better and usable designing.

1.5.1.4 Data sources

- Primary

Gathering data from students, instructors and experts who are specialists in this area

- Secondary

Previous studies and literature review.

1.5.1.5 The study scopes

-Spatial scope

Hebron – Palestine Polytechnic University

-Time scope starting from this semester.

1.5.1.6 The study sample

The community study and study sample will be the students and instructors in Palestine polytechnic university.

1.5.1.7 Methods of data analysis

We will use the prototype; and the data gathered from the study sample will be analyzed by using:

-Descriptive Statistics: mean, standard deviation

-Correlation: to show whether and how strongly pairs of variables are related

1.5.2 Operational segment

1.5.2.1 Requirement specification

This project will build a prototype to check the hypothesis; so the required resources for our project are:-

1-Visual Studio 2008:- is programming framework that supports over 5 programming languages, a special for the pocket PCs and the smart phones programming in addition it's supply a special emulator for these pocket PCs.

We aim to use it in making the program detects the user actions during using the interface.

2- SQL Server 2005:- which is coming with the visual studio and used for the creation of the databases with its relation and special diagrams.

We will use this in the creation of the databases which contain data about the actions that the user has done.

3- Desktop Computer: we need a Desktop computer to apply the detection prototype on it, and to store information and process it.

Table (1.1) Hardware requirement specification

| Item | Quantity | Specification |
|-------------------|----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|
| Personal Computer | 1 | Pentium 4 1800 MHz 265KB cash memory RAM 256 MB Hard Disk Drive 40 GB CD_ROM 52x PCI modem 56k Monitor 17 Keyboard , mouse , speaker |

4-Microsoft Windows: - there should be Microsoft windows that support the .NET framework to be able to execute Visual Studio projects.

1.5.2.2 Feasibility of the Study

- Human resource budget

The following table specifies the number of developers needed to accomplish the project, and their overall cost per a month.

Table (1.2) Human resource budget

| Human resource | Quantity | Number of months | Cost | Overall cost for 1 month |
|------------------|----------|------------------|--------|--------------------------|
| System developer | 3 | 1 | \$ 500 | \$ 1500 |
| Overall cost | \$ 1500 | | | |

- Physical budget: The following table specifies the needed physical components and their cost.

Table (1.3) Physical budget

Source: (Al-Manara Company for computers and internet, 20-5-2009)

| Item | Quantity | Specification | Cost |
|---------------|----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|
| Compatible PC | 1 | Pentium 4 1800MHz 156 KB cash memory RAM 256 MB Hard disk drive 40GHz Floppy drive 1.44 CD_ROM 52x Monitor 17 Keyboard , mouse ,speaker | \$ 550 |
| Over all Cost | | | \$ 550 |

-Software budget.

The following table specifies the needed software components and their cost.

Table (1.4) software budget

Source: (Al-Manara Company for computers and internet, 20-5-2009)

| Program | Cost |
|----------------------------------|--------|
| Windows XP professional | \$ 270 |
| SQL server 2005 | \$ 100 |
| Microsoft visual studio.net 2008 | \$ 500 |
| Microsoft Office 2003 | \$ 115 |
| Over all Cost | \$985 |

- Data collection budget.

- The following table specifies the needed aspects to accomplish the data collection process and the cost for each.

Table (1.5) data collection budget

| Data collection aspect | Cost |
|---------------------------|--------|
| study sample expenditures | \$ 100 |
| Questionnaires papers | \$ 100 |
| Transportation | \$ 50 |
| Over all Cost | \$ 250 |

Overall Cost:

The following table summarizes the overall cost for the project:

Table (1.6) Overall cost

| Human Resource cost | Physical resource Cost | Software resource Cost | Data Collection Cost | Overall Cost |
|---------------------|------------------------|------------------------|----------------------|--------------|
| \$ 1500 | \$ 550 | \$ 985 | \$ 250 | \$ 3285 |

2.1 Introduction

This chapter is concerned with establishing the theoretical foundation on which the proposed model is based. It presents a review of theoretical and empirical literature concerned with the design factors and affective expression.

Chapter two

Literature review

Section two presents the attitude-behavior theory, where section three presents some applied research in the area of attitude-behavior relation especially that is related to design factors, and section four presents the design program and user effect.

- ◆ Introduction
- ◆ Behavioral theories
- ◆ Applied researches

2.2.1 Theory of reasoned action (TRA)

TRA was developed in 1975 by Martin Fishbein and Jack Ajzen to specify the relationship between behavior and attitudes.

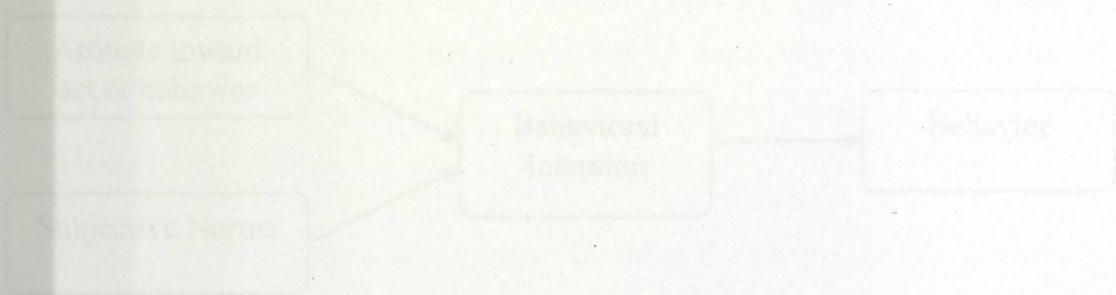


Figure 2-1: Theory of reasoned action (TRA)

(Davis et al, 1989)

Ajzen (2005) defines each of the three components of the theory as follows:
Attitude: the sum of beliefs about a particular behavior weighted by evaluations of those beliefs.

2.1 Introduction

This chapter is concerned with establishing the theoretical foundation on which the purposed model is based. It presents a review of theoretical and empirical literature concerned with the design factors and affective impression.

Section two presents the related behavioral theory where section three presents some applied research in the area of human computer interaction especially that is related to design factors, affective quality, affective impression and core affect.

2.2 Behavioral Theories

There are many theories which have focused on the relation between attitudes and behaviors. We are to discuss the three core theories in our study.

2.2.1 Theory of reasoned action (TRA)

TRA was developed in 1975 by Martin Fishbein and Icek Ajzen to specify the relationship between behavior and attitudes.

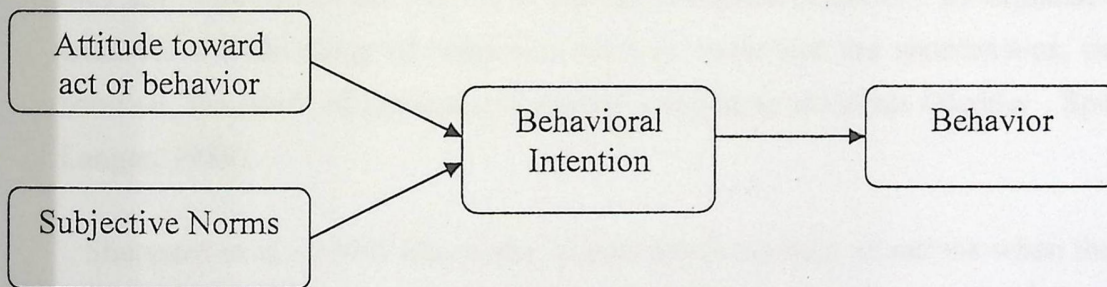


Figure (2-1): Theory of reasoned action (TRA)

Source (Davis et al, 1989)

Miller (2005) defines each of the three components of the theory as follows: "Attitudes: the sum of beliefs about a particular behavior weighted by evaluations of these beliefs.

Subjective norms: look at the influence of people in one's social environment on his/her behavioral intentions; the beliefs of people, weighted by the importance one attributes to each of their opinions, will influence one's behavioral intention."

In other words, "the person's perception that most people who are important to him or her think he should or should not perform the behavior in question" (Ajzen and Fishbein, 1975).

Behavioral intention: "a function of both attitudes toward a behavior and subjective norms toward that behavior, which has been found to predict actual behavior." (Miller, 2005)

The theory was, "born largely out of frustration with traditional attitude-behavior research, much of which found weak correlations between attitude measures and performance of volitional behaviors" (Hale, Householder, & Greene, 2003, p. 259).

Fishbein and Ajzen say, though, that attitudes and norms are not weighted equally in predicting behavior. (Miller, 2005, p.127).

Some Limitations and Extensions of the (TRA)

Hale et al. (2003) agree with the theory but make exceptions to the theory when they say "The aim of the TRA is to explain volitional behaviors. Its explanatory scope excludes a wide range of behaviors such as those that are spontaneous, impulsive, habitual, the result of cravings, or simply scripted or mindless (Bentler, Speckart, & Langer, 1989).

Sheppard et al. (1988) also make exceptions for certain situations when they say "a behavioral intention measure will predict the performance of any voluntary act, unless intent changes prior to performance or unless the intention measure does not correspond to the behavioral criterion in terms of action, target, context, time-frame and/or specificity" (p. 325)

Ajzen himself revised and extended the theory into the theory of planned behavior (TPB) "This extension involves the addition of one major predictor, perceived behavioral control, to the model. This addition was made to account for times when people have the intention of carrying out a behavior, but the actual behavior is

thwarted because they lack confidence or control over behavior” (Miller, 2005, p. 127).

2.2.2 Theory of Planned behavior (TPB)

It was proposed by Icek Ajzen as an extension of the theory of reasoned action. It is one of the most predictive persuasion theories. TPB talks about the link between attitudes and behavior. It has been applied to studies of the relations among beliefs, attitudes, behavioral intentions and behaviors in various fields

The theory of planned behavior considers that behaviors are located at some point along a continuum that extends from total control to a complete lack of control and that all behavior is not under volitional control. The control factors include both internal factors (such as abilities, skills, emotions, and information) and external factors (such as environmental or situation factors). Figure (2.2) shows the major components that related to the model of (TPB).

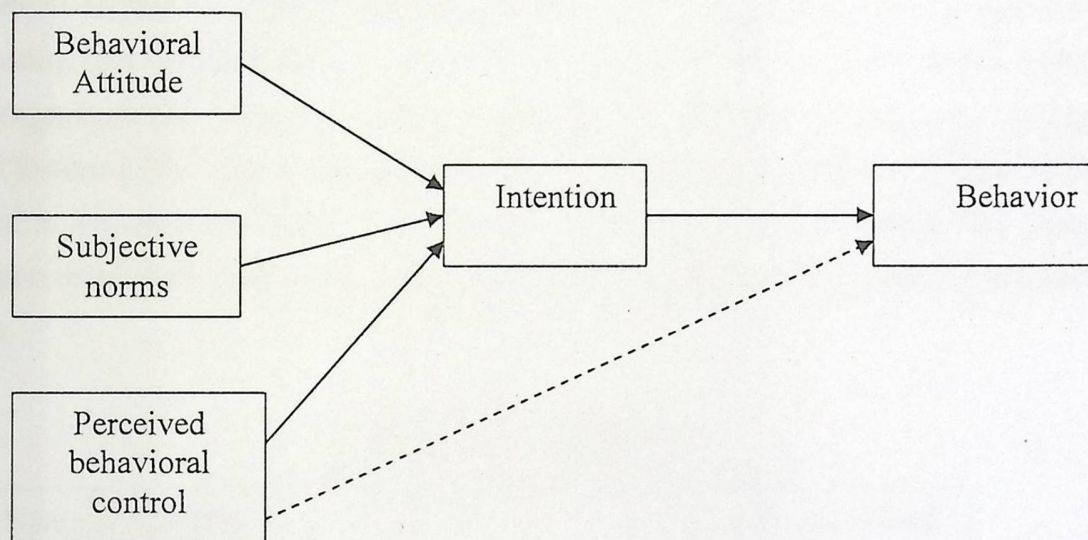


Figure (2-2): The Theory of Planned Behavior seeks to explain intention and behavior through actor's attitudes, social norms, perceived behavioral control

Source: (adapted from Armitage&Christian, 2004)

2.2.3 Technology Acceptance Model

The Technology Acceptance Model (TAM) is an adaptation of TRA that aims to explain how users come to accept and use a technology. It mentioned that when users

are presented with a new technology, a number of factors influence their decision about how and when they will use it, notably:

- Perceived ease-of-use Davis defined this as "the degree to which a person believes that using a particular system would be free from effort"
- Perceived usefulness. This was defined by Fred Davis as "the degree to which a person believes that using a particular system would enhance his or her job performance". (Davis, 1989).

The goal of TAM is to provide an explanation of determinants of computer acceptance (Fred d .Davis et al, 2007). Both of TRA and TAM assume that when someone forms an intention to act, they will be free to act without limitation. But in the everyday life there will be many constraints, such as limit the freedom to act (Bagozzi et al., 1992).

Perceived ease of use (EOU) refers to the degree to which the user expects the target system to be free of effort. Perceived usefulness is defined as the user's expectation that using specific application system will increase his or her job performance within an organizational context. (Hauser and Shugan 1980, Larcker and Lessing 1980, Swanson 1987) all of these studies have found variables similar to these to be linked to attitudes and usage. In other hand when these factors analyzed they found that perceived ease-of-use and perceived usefulness are statistically distinct from each other.

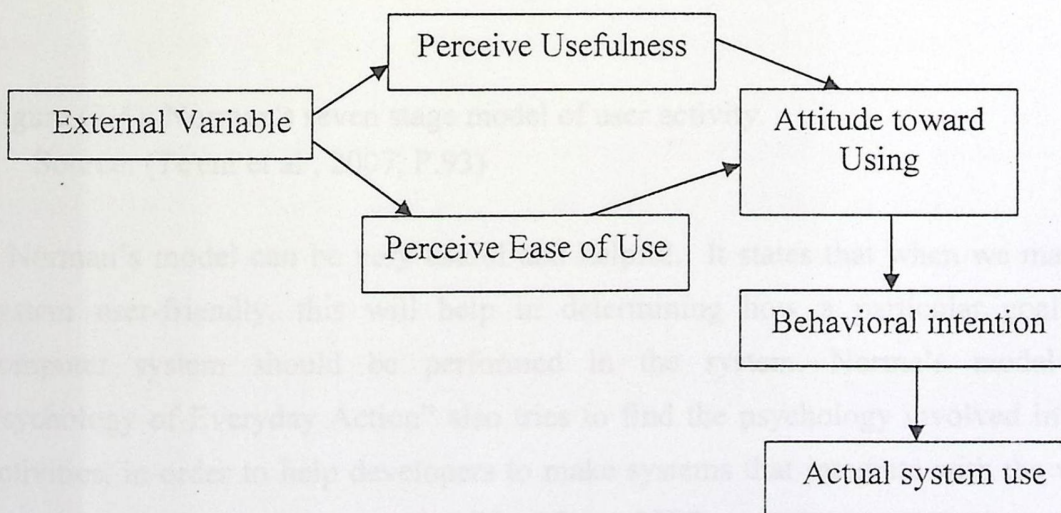


Figure (2-3): Technology Acceptance Model
Adapted from (Davis *et al*, 1989)

2.2.4 Norman's seven-stage model of user activity

Norman's model mainly takes activities done in everyday life such as eating and tries to analyze on how the specific goal is achieved, taking into consideration the sequence of actions taken along with the human factors involved in accomplishing the task or activity, with a focus on the interaction that the human makes with the instruments they are using to do the activity they attempt to do. (Oretu, 2007)

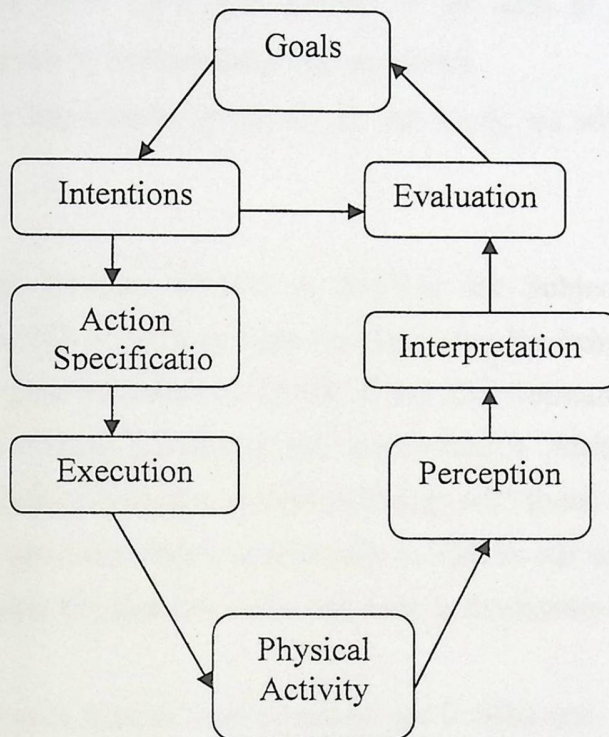


Figure (2-4): Norman's seven stage model of user activity.

Source: (Te'eni et al , 2007, P.93)

Norman's model can be very useful and helpful. It states that when we make the system user-friendly, this will help in determining how a particular goal on a computer system should be performed in the system. Norma's model "The Psychology of Everyday Action" also tries to find the psychology involved in doing activities, in order to help developers to make systems that integrate with the way in which people do things in everyday life. (Oretu,2007)

2.2.5 Conclusion of Behavioral Theories

We studied the previous theories of behavior because we aimed to know the user behavior towards different aspects of design factors. To do so, we have to take a look on these theories.

Behaviorism, along with several newer variations that have names like information processing theory, emphasizes the learning of facts and skills that authorities.

All previous theories focused on attitude as important factor to identify the human behavior all of them agree that attitude is the sum of beliefs about a particular behavior weighted by evaluations of these beliefs.

Because of the importance of attitude in our study, we will focus on user attitude to the interface.

The previous theories differed in dividing the Subjective norms of Theory of reasoned action (TRA) without focus on perceiving the behaviors control.

As Theory of planned behavior (TPB) where the Norman divides this step to multi stages, but all of them focused on the importance of Attitude Toward Using as fetal factor of the human behavior so that our study will focus on it . And the main point that all of the previous theory is attention so that in our study we will focus on how the interface takes the user attention and what is the factors that lead to this.

All of the previous studies lead of actual use is behavior, which is the main issue in our study; all of them also deal with behavior as a final step in the Behavioral theories. And so we find that studying the user behavior will be very helpful in our work.

Graphical user interface: a user interface based on graphics (icons, pictures and menus) instead of text only; uses a mouse as well as a keyboard as an input.

User interface design is important. This importance comes from different sides. First of all, the more intuitive the user interface the easier it is to use, and the easier it is to use, the less expensive to use it. The better the user interface, the easier it is to train people to use it, reducing your training costs. The better your user interface, the less help people will need to use it, reducing your support costs. The better your user interface, the more users will like to use it, and so on. Also, their satisfaction with the work will increase. (Human-Computer Interaction: Principles of Interface Design, Patrizia Nanni , 2004)

2.3 Applied Research

2.3.1 Design Factors

The Design factors are all of the elements within the limits of the user interface, the primary design factors identified included texture, shape and color.

1. Diverse Media

When we say “Diverse media”, we mainly mean mixed media such as sound, text, animation and video. This media can help the user in many ways; for example many applications display a picture or video of person when a voice recording is played. (Chris Johnson, Department of Computer Science, University of Glasgow)

Additionally, the user attention is not distracted by one of the media e.g. animation and sound can work well together, but animation and text presented simultaneously is likely to be distracting, When using a combination of media e.g. text, sound, animation and video, we should be careful that the users attention is not distracted by one or other of the media. E.g. animation and sound can work well together, but animation and text presented simultaneously is likely to be distracting.

2. Colour

Colour should not be considered to be the main way to transfer meaning. However, colour is an important element in graphic design and careful colour selection can also enhance accessibility. On the other hand, for people with colour deficits, the ability to distinguish between colours is diminished and so this may appear as a problem. (Arditi ,1999).

RNIB (2004) recommends that no more than five colours should be used in any display. Redundancy should enable the controls to be inferred through other means that would benefit people with decreased colour perception.

Arditi (1999) lists three rules for effective colour selections, listed below.

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

Eiseman found that the loss of sensitivity to blue means that warm colours are more easily distinguished. "To better see cool colours, 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 & Reimann, 2003).

Users generally expect some use of colour in an interface, at best, adversely affect aesthetics, and at worst, can render the interface unusable. The following common mistakes should be avoided (Cooper & Reimann, 2003):

- Too many colours.
- Excessive saturation.
- Inadequate attention to colour impairment.

Thus, color should not be considered as the sole means of transferring important information. However, it can be used in conjunction with other good design principles. The most important point when using color is to know the intended users and their ability to understand the interface. (Human-Computer Interaction: Principles of Interface Design, Patrizia Nanni, 2004)

3. Text

“Before graphic user interfaces, text was the primary means of both input and output defining human-computer interactions. Even today, much of the information user interfaces present is textual. Therefore, we should not underestimate how 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)

-Font Type

“On computer screens, sans serif fonts are preferable, because relatively low screen resolutions...make serif fonts look fuzzier, especially in small sizes.” (Komischke, 2009)

Letter Case-

“Ergonomists have consistently recommended using mixed case letters and shy away from using all uppercase letters, especially for continuous text.” (Komischke, 2009)

Experiments showed that, all uppercase is more legible, in terms of reading speed, than the other letter cases, especially for visually impaired persons (Arditi et al, 2007)

-Text Alignment

The extra spaces that appear between individual words often create continuous vertical spaces that can appear meaningful. This can be distracting to readers who try to deal with texture interface (Watzmann et al, 2008)

Text Orientation-

“Research confirms that people can read text with a horizontal orientation the fastest.”(Byrne et al, 2002)

Font Size-

Font size is a very important factor in determining character legibility. Font size is just one determinant of the physical size of a character on a computer screen, so, it

would be better to build our expectations of character size on physiological measures. In other words, the user concern of what he/she sees on the screen, not what the designers and developers used when they make the interface. (Komischke, 2009)

Conclusion

Text is a fundamental component. The appropriate treatment of text is only one of many building blocks that determine the usability and the user experience of a user interface. (Komischke, 2009).

4. Icons

Webster's Revised Unabridged Dictionary defines an *icon* as "a sign (a word or graphic symbol) whose form suggests its meaning." (Webster Dictionary, 1998)

The notion of an icon is a very old one, dating back to the 8th century, when an icon was a representation of a religious figure. (Encyclopædia Britannica 1998)

On a computer screen, an icon is any graphical representation which refers to an object or an action that can be performed. (Rossi & Querrioux-Coulobmier 1997).

Many of us may have a question of why do computers use icons. There are multiple representations for objects in the real world, and the situation is the same on a computer screen. Computers could simply use words, for example "Print," to represent the action of printing a document. So-called command-line interfaces, such as UNIX, do represent commands and files in this way.

However, both research and experience show that "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 & Querrioux-Coulobmier, 1997)

Furthermore, there are some objects that cannot be represented in textual form.

Tullis (1988) talks about the application "Mac Paint", which is used to create and represent graphical images. He suggests trying to represent the picture in using alphanumeric characters. This is clearly a very difficult, if not impossible, task.. After all, a picture is worth a thousand words.

Icons are not necessarily the best way to represent data, however. Rossi & Querrioux Coulobmier suggest that “the relationship between an icon and its meaning should be automatically and consequently independent of any learning.” (1997) 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, Miller, & Huchingson (1997) showed that this indeed is the case. In their experiments, they presented subjects with a computer term (either an object such as “clipboard”, or an action, such as “erase”) and four alternative but similar icons from which subjects had to choose the one that best represented the term.

They found that the icons that worked best are those that most concretely represented the object or action and were most visually.

5. 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. Unlike a command-line interface (such as UNIX or MS-DOS), “menus have the advantage that users do not have to remember the item they want, they only need to recognize it” (Preece, 1994).

To utilize menus, user must find the menu item that corresponds to the desired action, and then select that menu item. This process involves both memory (the user must remember the mapping of menu item to action performed) and visual search (the user must compare the needed menu item to the menu items available and find the correct one). This process is called entity matching (Preece 1994).

Mills & Prime (1990) studied the effects of rectangular versus circular menus as well as moving versus static menus. Their results showed that for menus with few items, circular menus are the most efficient form, as all of the menu items are equidistant from the center of the circle, which is where the cursor is located when menu item selection begins.

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 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.

Learning effects also play a key role in performance of subjects. Over time, static menus can be learned better than moving menus. (Mills & Prime, 1990)

A severe example of this was performance on rectangular static menus: Mills & Prime (1990) noted that subjects tended to pay less attention to this type of menu “because of their familiarity with it, as to novel styles.”

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, Duffy, & Palmer 1989)

2.3.2 Affective Quality

Affect (mood, emotion, feelings) is a fundamental aspect of human beings and is found to influence reflex, perception, cognition, and behavior (Norman, 2002; Russell, 2003; Zhang, P. & Li, N. 2004)

Affective quality is the ability of an object or stimulus to cause changes in one's affect. Limited empirical data in Human-Computer Interaction research suggest that perceived affective or hedonic quality of an interface has a positive impact on users'

perceived usability of the system.(Schenkman et al ,2000; Tractinsky et al ,2000; Zhang, P. & Li,N. 2004)

And (Russell,2003) added that Affective quality (AQ) is the ability to cause a change in core affect, where the core affect as Core (also known as Affect, Feeling, Mood) is a neurophysiologic state that is consciously accessible as a simple, no reflective feeling affect(Zhang. & Li, 2004)

It is discovered that 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 (Norman, 2002)

The Affective quality constructs are:

1. Interactivity:

It is similar to the degree of responsiveness, and is examined as a communication process in which each message is related to the previous messages exchanged, and to the relation of those messages to the messages preceding them.(wekipedia)

level of interactivity is Noninteractive, when a message is not related to previous messages; Reactive, when a message is related only to one immediately previous message; and Interactive, when a message is related to a number of previous messages and to the relationship between them (Sheizaf Rafaeli,1988)

Interaction styles: refer to the different ways of communication between a human and a computer based on a technological platform through interaction techniques which are “way of using a physical input/output device to perform a generic task in a human-computer dialogue” (Foley at al., 1990). Interaction style is explained “through prototypical elements of the interface and how they behave, for instance command line, pull down menu, form fill in, or direct manipulation” (Shneiderman, 1992).

Measurement of interactivity adapted from (Dix et al, 2000):

1. *Learn ability*: the ease with which new user can begin effective interaction and achieve maximum performance.

Learn ability concern the feature of interactive system that allow novice user to understand how user initially, and how to attain a maximum level of performance.

The specific principle that support learns ability:

- 1.1 Predictability : support for user to determine the effect of future action based on past interaction history
- 1.2 Synthesizability :support for the user to asses the effect of the past operation on the current state
- 1.3 Familiarly :the extent to which a user s knowledge and experience in other real world or computer based domain can be applied when interacting with a new system
- 1.4 Generalizability : support for the user to extend knowledge of specific interaction within and across application to other similar situation
- 1.5 Consistency: likeness in input –output behavior arising from similar situation or similar situation or similar situation or similar task objective.

2. *Flexibility*: the multiplicity of ways the user and system exchange information

The identity principle that contribute to the flexibility of interaction:

- 2.1 Dialog initiative: allowing the user freedom from artificial constraints on the input dialog imposed by the system.
- 2.2 Multi- threading: ability of the system to support user interaction pertaining to more than one task at the time.
- 2.3 Task migrability: the ability to pass control for execution of given task so that it becomes either internalized by user or system or share between them.

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2.4 Substitutivity: Allowing equivalent value of input and output to be arbitrarily substituted for each other.

2.5 Customizability: modifiability of the user interface by the user or the system.

3. *Robustness*: the level of support provided to the user in determining successful achievement and assessment of goal

The principle that affecting on robustness is:

3.1 observations: Ability of the user to evaluate the internal state of the system forms its perceivable representation.

3.2 Recoverability: Ability of user to take corrective action once an error has been recognize

3.3 Responsivness: How the user perceive the rate of communication with the system.

3.4 Task conformance: the degree to which the system services support all of the user wishes to perform and in the way that the user under stand them

3. Structure

The model of structure which is used to produce more concrete models of the user interface design:

Model derivation: one or many unspecified models are derived from one or many already specified models according to transformation rules, the parameters of which are controlled by the designer.

Model linking/binding: one or many already specified models are processed to establish relationships between the elements in the various models available.

Model composition: models which are already specified are partially or totally assembled either to rebuild the source models or to build another model (e.g., in reverse engineering) related to the same real world .

General measurement and function of interface structure adapted from (te'eni et al, 2007):

1. Data input and feed back: input data by selecting from predefined values or generating new values.
2. Navigation controls and feed back: control the intersystem flow of activities and under navigation of the system
3. Quantitive displays: output quantitative information
4. Input information about some entry: input related data that describe some entity and there for share some common context
5. Output information about some entry: related data that describe some entity and there for share some common context
6. Search and browsing: search for a specified piece of information located in some information environment or targeted pr no targeted information.
7. Exploratory decision making: decide on a solution by investigating the impact of different value s for given parameter

4. Beauty

Beauty is subjective and personal decision and that change from person to person, from culture to culture, so the definition of Beauty is studied as part of aesthetics, sociology, social psychology, and culture. As a cultural creation, beauty has been extremely commercialized. An "ideal beauty" is an entity which is admired, or possesses features widely attributed to beauty in a particular culture.

(Wikipedia). Beauty is measure form color, consistancy, style, culture for the user and designer.

Beauty measurements (te'eni et al, 2007)

1. Balance: balance the optimal weight of screen element for example doesn't place a heavy element on one side of screen and light element on the other side.
2. Equilibrium: maintain amid way center of suspension
3. Symmetry: arrange elements so that elements on one side of the center line replicate on the other side

4. Order: order elements to correspond with hierarchy of perceptual prominence for example arrange object on the screen according to their size from left to right in the descending order

5. Consistent ratio: maintain consistent ratio between height width, if the width of the over all frame is greater than its height arrange element to follow this ratio.

6. Unity: attempt coherence of the layout by keeping element relevant proximity.

7. Alignment: align elements horizontally and vertically

8. Density: optimize the occupied areas of the screen as leaving about a half of ht screen area as a white space is pleasing to the eye.

9. Rythem: introduction regular patterns of change in the element like two moving elements on the screen should move at the same pace

There are two types of components of the screen structure, which are:

1. *low level component :*

1.1 colors: differentiate data item group element, signal order and meaning impact mood.

1.2 voice: convey meaning and emotion ,signal impotence instruct tools

1.3 Text: convey meaning and emotion

1.4 video: convey meaning and emotion display dynamic behavior

2. *High level component :*

It has several components; like:

2.1 selections: as radio button, check box, list box.

2.2 Menu: set of options displayed on the screen where the select

2.3 Graphics

2.4 form fill-in: the simplest style of interaction that consists of the user being required to answer questions or fill in numbers in a fixed format rather like filling out a form (Shneiderman, 1992).

- Home page: multiple windows for multiple view of the screen
- Aesthetics is commonly known as the study of sensory or sensori-emotional values, sometimes called judgments of sentiment and taste(Zangwill,2007)

The aesthetics of an artifact are the immediate feelings evoked when experiencing that artifact via the sensory system. I consider aesthetic responses to be different from other cognitive responses in at least three ways. Aesthetic response is rapid, usually within seconds of exposure to the artifact. Aesthetic response is involuntary, requiring little if any expenditure of cognitive effort. Aesthetic response is an aggregate assessment biased either positively (e.g, beauty or attraction) or negatively (e.g., ugliness or repulsion) and not a nuanced multi-dimensional evaluation.(Karl T. Ulrich,2006)

Importance of Aesthetics in design is referred to three reasons; all other things equal, most users will prefer a beautiful artifact to an ugly artifact, even in highly functional domains such as scientific instruments.

Thus, beauty can be thought of as “just another attribute” in a user’s evaluation of preference, alongside durability, ease of use, cost, and safety.

In this respect, the aesthetic quality of an artifact is an important factor in providing a satisfying user experience, the prime motive for design. Second, the aesthetic response to an artifact is usually the first response to the artifact. First impressions matter, and overcoming an initial aesthetic repulsion is a substantial challenge for the designer, better avoided in the first place .Third, beauty may serve as a signal for unobservable attributes of quality, much as a brand does for products and services. In such cases, beauty itself is less important than what else the observer may infer from an exhibition of beauty. (Karl T. Ulrich, 2006)

5. Vividness

It's the richness of representation in the human computer interface.

Vividness is influenced by sensor breadth (visual) and sensor depth (resolution) (te'eni et al, 2007).

Vividness is composed of sensory breadth and sensory depth. According to the theory, it is expected that the higher the number of sensory outputs, the greater the chance that the medium will produce a higher sense of presence. Actually, Short et al. (1976) proved this assumption by showing that media that provide both audio and visual stimuli produce greater social presence than audio-only. Regarding sensory depth, visual display characteristics can play an important role for presence. For example, high resolution quality and large image size can elicit more reality and a higher perception of presence (e.g., Reeves, Detenber, & Steuer, 1993; Bocker & Muhlbach, 1993; Lombard, 1995). Therefore, it is likely that the higher the number of sensory channels (or breadth) or the higher the quality of sensory fidelity (or depth), the higher the degree to which the senses are engaged, and the higher the level of presence.

Theory of Vividness and Communication Modality

Information is vivid to the extent that it attracts or holds attention and excites the imagination and vividly presented information has more impact on judgment than does pallid and abstract information (Nisbett & Ross, 1980). Communication modality is one of the major sources of vividness effects (Kisielius & Sternthal, 1986). Even though the effects of vividness on persuasion seem controversial, several researches show that communication modality has an effect on attitude change (Choi et al, 2001).

The availability-valence hypothesis posits that attitudes depend on the favorableness of the information that is available in memory (Nisbett & Ross, 1980). According to this view, vividness of message can affect attitudes by influencing the extent to which people will engage in cognitive elaboration. To the extent that information is rich in modality, messages using these devices are likely to enhance the number of message-relevant associations in memory. Whether vivid information evokes cognitive elaboration that may enhance, undermine, or have no effect on the persuasiveness of a message depends on the relative favorableness of the information in response to vivid or pallid presentations (Mousavi et al ,1995) suggest that dual-presentation modalities

may increase working memory resources by activating both auditory and the visual working memory rather than just one or the other. (Chaiken and Eagly, 1983) found that a video presentation presented by a likable source was more effective than the same message presented in audio or written format. Conversely, for an unlikable source, audio and written messages were more persuasive than video message presentations. Similarly, it is expected that the advertising Web site presenting an anthropomorphic agent will induce greater cognitive elaboration than the Web without an agent because of the agent's audio-visual message presentation. Simultaneously, an agent's nonverbal cues may have some effects on the valence of relevant information.

2.4 Affective Impressions

Affective impression is the user appraisal of the affective qualities of the HCI (Te'eni et al, 2007).

Park et al make a study to confirm that lighting effects can change affective impressions of photographs. The stimuli were images of living things, a natural scene, and architectures. The affective impressions were evaluated on a 7-point scale based on three affective dimensions (Park et al, 2004). In experiment 1, the original images and images with four kinds of light effects were compared--lighting from: top left, top right, bottom left, and bottom right. On the positive - negative impression, lighting effects from top left and bottom left were more negative than the original. On the static - dynamic impression, the images with lighting effects of all directions made the original change to a more dynamic impression. There was no difference of affective impressions between the original image and the lighting effect of any direction on the light - heavy impression. In experiment 2, original images, the images of highlighting centre (HC), and the images of blurred background (BB) were compared. BBs were more negative, more dynamic, and heavier than the original, but there was no difference of impressions between HC and the original. These results imply that change of lighting position can affect perceived position of emphasized area of images and it affects overall cognitive process and affective impressions

It has been suggested that affective impressions can generally be summarized as three factors (activity, potency, and evaluation) by using the semantic differential method (Osgood et al, 1957).

Recognize or memorize objects in their daily lives that consist of combinations of many attributes, such as several parts, colors, or textures. We are interested in trying to determine what types of combinations tend to be more memorable (Sakuta et al, 2006).

Many researchers have shown that congruent information with schema or context can be recognized well (Bellezza & Bower, 1981; Cohen, 1977; Cohen, 1981; Judd & Kulik, 1980; Smith & Graesser, 1981).

2.4.1 Measurement of affective impression

1. Adorable

The free dictionary defines Adorable as a very attractive, lovable or having characteristics that attract love or affection.

In our study we try to detect such impressions and manage them in order to make the user probably reach the core affects as elated and happy.

Wikipedia defined impression management as the process through which people try to control the impressions other people form of them. It is a goal-directed conscious or unconscious attempt to influence the perceptions of other people about a person, object or event by regulating and controlling information in social interaction.^[1] It is usually used synonymously with self-presentation, if a person tries to influence the perception of their image. The notion of impression management also refers to practices in professional communication and public relations, where the term is used to describe the process of formation of a company's or organizations public image.

(Dillard, Courtney et al. (2000); Piwinger, Manfred; Ebert, Helmut (2002); Schlenker, Barry R. (1980))

2. Tense

The free dictionary defines tense as (having, showing, or causing mental or emotional strain).

2.5 Core affect

Also known as Affect, Feeling, and Mood) is a neurophysiological state that is consciously accessible as a simple, nonreflective feeling. It is considered as an integral blend of hedonic or valence (pleasure-displeasure, the extent to which one is generally feeling good or bad) and arousal or activation (sleepy-activated, the extent to which one is feeling engaged or energized) values. In addition, the state of the art research on core affect indicates that core affect is primitive, universal, ubiquitous, and is the core of all emotion-laden occurring events (Russell, 2003)

Core affect is that neurophysiologic state consciously accessible as the simplest raw (no reflective) feelings evident in moods and emotions. It is similar to what Thayer (1989) called *activation* what Watson and Tellegen (1985) called *affect*, what Morris, (1989) called *mood*, and what is commonly called a *feeling*. At a given moment, the conscious experience (the raw feeling) is a single integral blend of two dimensions, hence describable as a single point on the map of Figure 1. The horizontal dimension, pleasure-displeasure, ranges from one extreme (e.g., agony) through a neutral point (adaptation level) to its opposite extreme (e.g., ecstasy). The feeling is an assessment of one's current condition. The vertical dimension, arousal, ranges from sleep, then drowsiness, through various stages of alertness to frenetic excitement. The feeling is one's sense of mobilization and energy. Some names for regions of Figure 1 are emotional (*elated, upset, depressed*) and some are not (*tense, calm, serene, comfortable, fatigued, bored, drowsy*). Names also differ in the degree to which they denote core affect. At one end of a continuum are names that denote nothing else (*feeling good or bad, sleepy or wide awake*); at the other end are names that merely hint at core affect

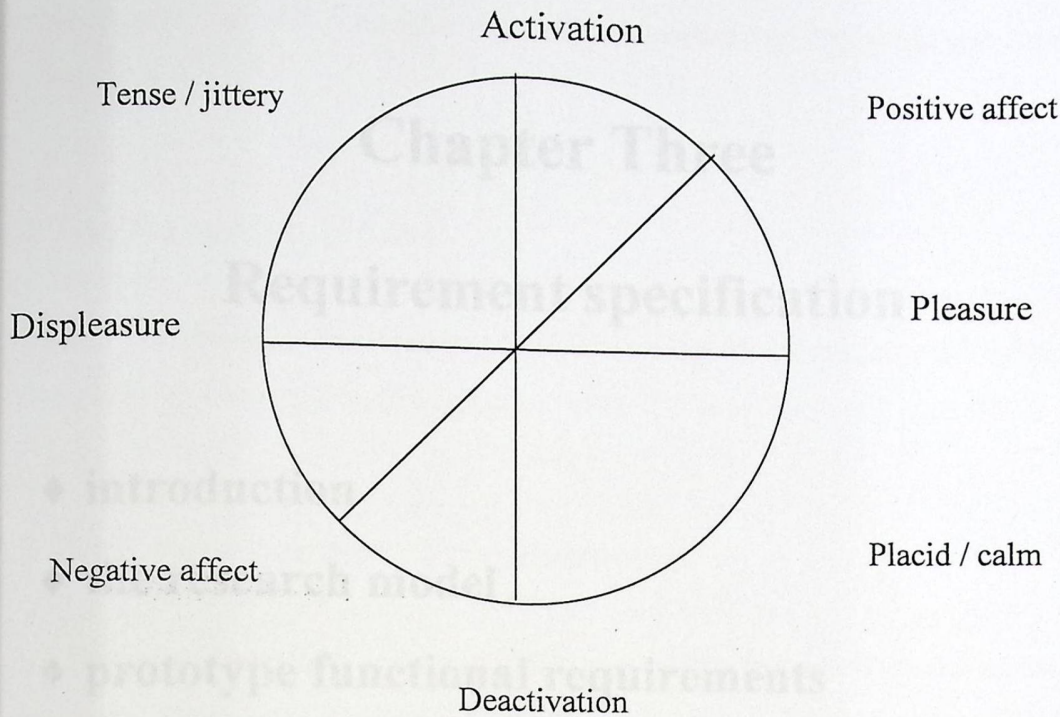


Figure (2.5) Model of core affect
 Source: adapted from (Russell, 2003)

Function of core affect

Core affect is a continuous assessment of one's current state, and it affects other psychological processes accordingly. A change in core affect evokes a search for its cause and therefore facilitates attention to and accessibility of like-valenced material. Core affect thus guides cognitive processing according to the principle of mood congruency. The more positive core affect is, the more positive events encountered or remembered or envisioned seem— provided that the core affect is not attributed elsewhere (Schwarz & Clore, 1983). Core affect is part of the information used to estimate affective quality and thus is implicated in incidental acquisition of preferences and attitudes. Core affect influences behavior from reflexes (Lang, 1995) to complex decision making.

One can seek to alter or maintain core affect directly—*affect regulation*—from the morning coffee to the evening brandy. People generally (but not always) seek behavioral options that maximize pleasure and minimize displeasure. Decisions thus involve.

Chapter Three

Requirement specification

- ◆ introduction
- ◆ the research model
- ◆ prototype functional requirements

3.1 Introduction

In this chapter we will introduce our research model and the prototype functional requirements.

3.2 The Research Model

The research model aims to achieve the research objectives which we specified in chapter 1. The model as shown in figure (1-1) in page four; represents the relationship between design factors, affective qualities, affective impression and core affect.

3.3 Prototype functional requirements

3.3.1 Design an interface using the following design factors (Diverse media, text, Resolution, Metaphors, Color, Menus, Icons, Buttons, Toolbars, Palettes, Dialog boxes).

Table 3.1 functional requirements for design experimental interface.

| | |
|---------------------------|----------------------------------------------------------------------|
| function | Design experimental interface |
| Description | Design an interface using design factors used in the research model. |
| Input | Design factor |
| source | Literature review |
| output | Experimental interface |
| Aim | Make interface that have the factors which we will test |
| requirement | Having enough design factors |
| Conditions before execute | - |
| Conditions after execute | Save user actions on the interface |
| impact | None |

3.3.2 The ability to tracking user behaviors during using the interface

Table 3.2 the ability to tracking user behaviors during using the interface functional requirements

| | |
|---------------------------|-----------------------------------------------------------------|
| function | Tracking user behaviors |
| Description | Give the user control over the interface and detect his actions |
| input | Events on the interface |
| source | User |
| output | new interface with changes made by user |
| Aim | Detect the user changes on the interface |
| requirement | Normal user, experimental interface |
| Conditions before execute | - |
| Conditions after execute | Save user actions in data base |
| impact | None |

3.3.3 Save the user action on the interface

Table 3.3 save the user action on the interface functional requirements

| | |
|---------------------------|------------------------------------------|
| function | Save user actions |
| Description | Save user actions in data base |
| input | Events on the interface |
| source | Interface |
| output | Report |
| Aim | Study the user behavior on the interface |
| requirement | Data from the interface, data base |
| Conditions before execute | Make user changes on the interface |
| Conditions after execute | - |
| impact | None |

3.3.4 Statistics

The following table describes the functional requirements needed to make the statistics about the data gathering from study sample.

Table 3.4 statistics functional requirements

| | |
|---------------------------|------------------------------------------------------------------------------------------------------|
| function | Make statistics about tracking user behavior |
| Description | Make statistics about tracking user behavior on interface with design factors used in research model |
| input | Reports |
| source | Interface |
| output | Result and relation of user behavior and design factors |
| Aim | Find the relation between the user behaviors and research model |
| requirement | Data from the interface, data base |
| Conditions before execute | Make user changes on the interface |
| Conditions after execute | - |
| impact | None |

3.4 Context diagram

The following Context Diagram (figure (3-1)) shows the relation between the system and the external environment, also show how they interact with each other.

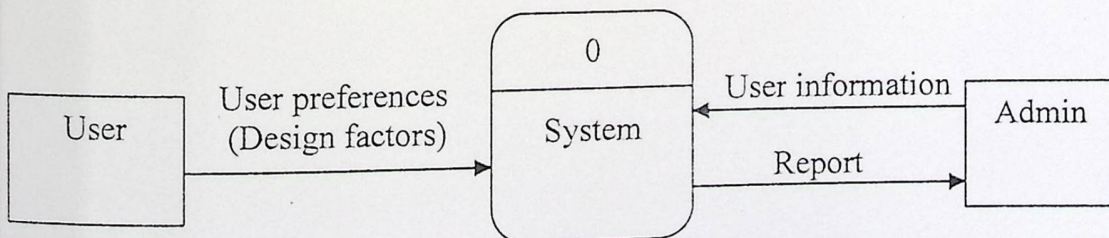


Figure (3-1): Context Diagram

3.4 Data flow diagram

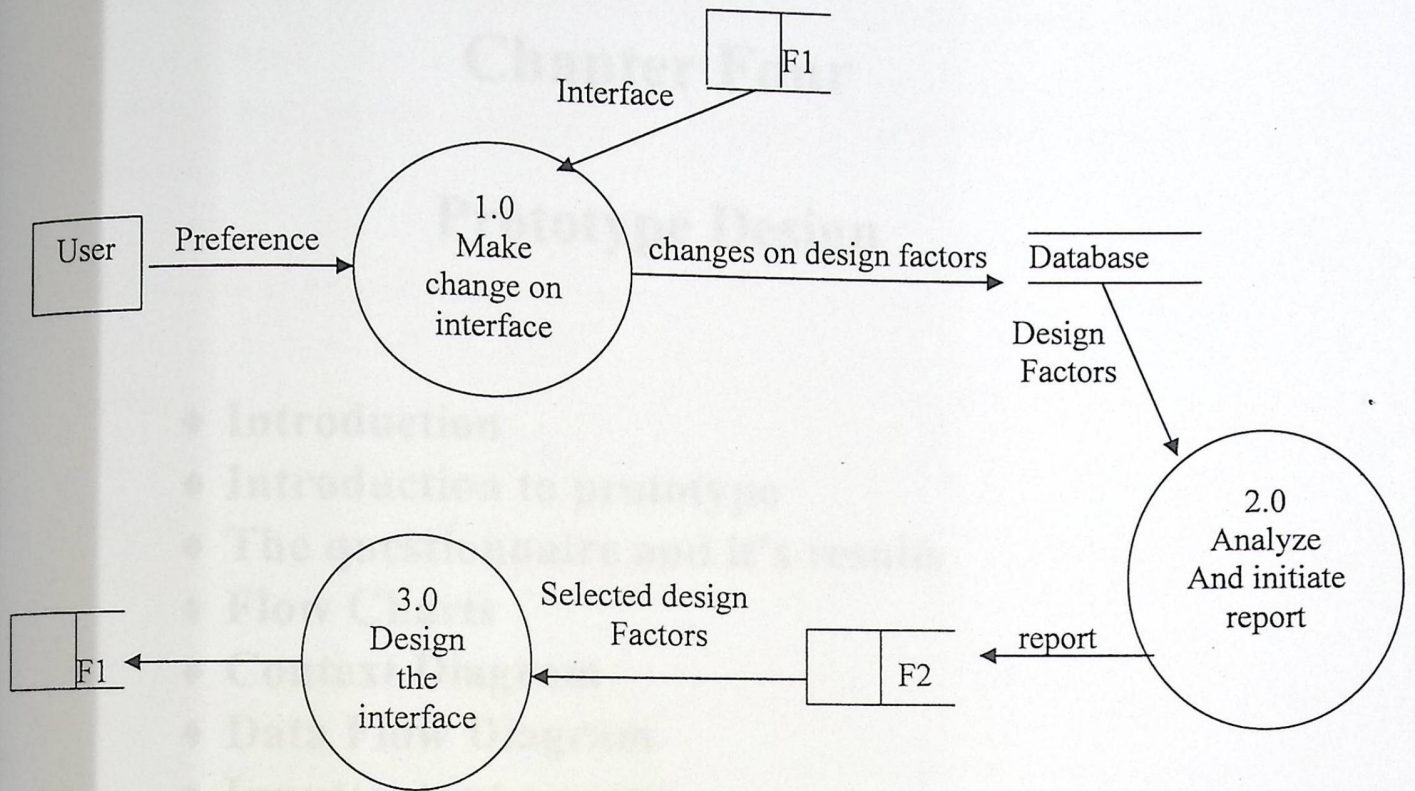


Figure (3-2): Data Flow Diagram.

Chapter Four

Prototype Design

- ◆ Introduction
- ◆ Introduction to prototype
- ◆ The questionnaire and it's results
- ◆ Flow Charts
- ◆ Context Diagram
- ◆ Data Flow Diagram
- ◆ Input/output screens
- ◆ Database design

4.1 Introduction

This research aims to examine the relationships between research variables and to do this an experiment should be designed. This experiment will build according to the prototype.

Prototype design process concerned with designing the prototype functions to be implemented later.

in this chapter we will explore introduction about prototype in general ,then The questionnaire results will be analyzed. Snapshot of input / output screens will be included.

The Flow Chart, Context Diagram, Data Flow Diagram, Database Design, and database tables will be explore.

4.2 Introduction about prototype:

Recently the researcher reach to the requirements for an interactive system can not be completely specification at the beginning of the life cycle, to be sure about some features of the potential design is to build them and test them out on real user.

This is iterative design which described by the use of prototypes on the technical side this is lead to define prototype: "The creation an action of model based on operational scenarios" (Houde, *et al*, 1995)

Prototype is: "useful Para diagram, its lend to interact between customer, user, and developer that lead to early validation of specification and design" (Houde, *et al*, 1995) other definition: "Prototype is designing interactive system demand collaboration between designers, many different disciplines" (Kim, 1990).

Every one has a different expectation what is a prototype, for example industrial designers call a molded foam model a prototype, otherwise [Interaction designer define a prototype a simulation of on screen appearance and behavior as a prototype.] Programmer call a test program a prototype (Houde, *et al*, 1995)

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Every one has a different expectation what is a prototype, for example industrial designers call a molded foam model a prototype, otherwise [Interaction designer define a prototype a simulation of on screen appearance and behavior as a prototype.] Programmer call a test program a prototype (Houde, *et al*, 1995)

4.3 Prototype process

A process model for development is shown in Figure (1).

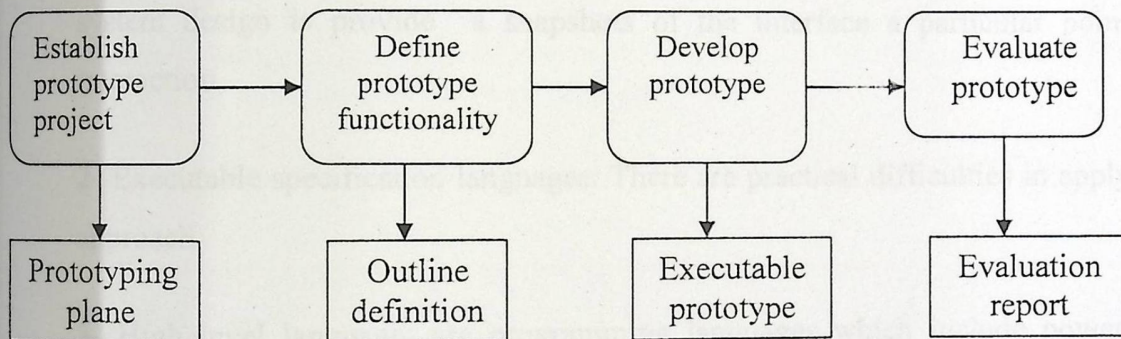


Figure (4-1): the process of prototyping development
 (Source: Sommerville, Ian. (2007). Software engineering, 6th edition .p 139)

Types of prototype:

1. **Throw Away:** this prototype built and tested to design the knowledge that is used to build the final product but the actual prototype is discard the main aim of this prototype is arriving to the final requirement specification for the design process to precede.

2. Incremental prototype: the final product is built as a separate component, this part is divided into independent and smaller components of the product, each partition is released including one or more components

3. Evolutionary prototype: "This prototype is not discarded and serves as the basis for the next iteration of design"

The real and actual system is seen as a very limited initial version which must be made to the system during the activity in the life cycle

Technique for prototyping:

1- Story board: it's a simplest notion of prototype which is a graphical depiction of the appearance of the intended system.

Story boards don't require much in terms of computing power to construct, they can be mocked up without aid of any computer resource, story board for the interactive system design is provided as snapshots of the interface at a particular point in the interaction.

2- Executable specification languages: There are practical difficulties in applying this approach

3- High level language: are programming languages which include powerful data management facilities, and also its Very high level dynamic languages are not normally used for large system development.

4- User interface prototyping: Interface generation systems may be based around user interface management systems which provide basic user interface functionality it is important to realize user interface prototyping is an essential part of designing the process.

5- Composition of reusable components: that is involves developing a system specification by taking account of what reusable components are exist and available. Prototyping using reusable components is often combined with other approaches using very high level. (Sommerville, 2007.pp 145-152)

Conclusion:

From our readings we choose the Throw Away prototyping because it can significantly reduce risk, this kind of prototype using at any time on project by any of the project personnel, also it can be realize the risk on the specific area of project, and the main key of success to this kind is this prototype enable quick prototyping and commit to throwing the prototype away.

4.4 The Questionnaire results analysis

We have design a questionnaire, then we distributed it to a sample size of 60 expert persons (programmer, developers, teachers ...etc).

Then we analyzed the results, we got the following results for each design factor:

| Design Factor | Questions | Average | VAR | Notes |
|---------------|-----------|---------|----------|----------|
| Diverse Media | 1 | 3.88 | 0.329923 | Accepted |

We visited Cairo Amman Bank and made interviews with employees and according to their opinions, we exclude firstly diverse media because they said that they don't concern with having divers media in there business application.

| Design Factor | Questions | Average | VAR | Notes |
|---------------|-----------|---------|----------|----------|
| Sound | 2 | 3.88 | 0.329923 | Accepted |

Second sound they said it is not important and it doesn't make difference in their work.

| Design Factor | Questions | Average | VAR | Notes |
|---------------|-----------|---------|----------|----------|
| Pallets | 8 | 3.97 | 0.646206 | Accepted |

Then we asked them about pallets they said that they like stability in the application and don't like making changes in it.

| Design Factor | Questions | Average | VAR | Notes |
|---------------|-----------|---------|---------|----------|
| Metaphors | 15 | 4.28 | 0.44416 | Accepted |

We asked hem about metaphors they said that it distracting attention.

| Design Factor | Questions | Average | VAR | Notes |
|---------------|-----------|---------|----------|--------------|
| Icons | 5 | 2.89 | 1.180733 | Not Accepted |

We exclude icons because the average was less than three.

| Design Factor | Questions | Average | VAR | Notes |
|---------------|-----------|---------|----------|--------------|
| Resolution | 4,7 | 4.52 | 1.180733 | Not Accepted |

We exclude resolution because its variance was more than one.

| Design Factor | Questions | Average | VAR | Notes |
|---------------|-----------|---------|----------|--------------|
| Buttons | 17 | 3.31 | 1.161552 | Not Accepted |

We exclude buttons because its variance was more than one.

So we will design the experiment interface according to the resulting design factors which are (Text, Menus, Toolbar, Color and Dialog box)

4.5 (Input/Output) Screens

Input Screens:

يقوم فريق البحث بعمل دراسة حول تأثير عناصر التصميم المستخدمة في بناء التطبيقات الحاسوبية على مدى تفاعل واستجابة المستخدم لهذه التطبيقات وتأثيرها على الانطباعات الوجدانية لديه .

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Figure (4-2): welcome input screen

التسجيل دليل الجامعة تعليمات

khatOoOm-PC 40

الإسم الرباعي اللغة العربية

الإسم الرباعي اللغة الانجليزية

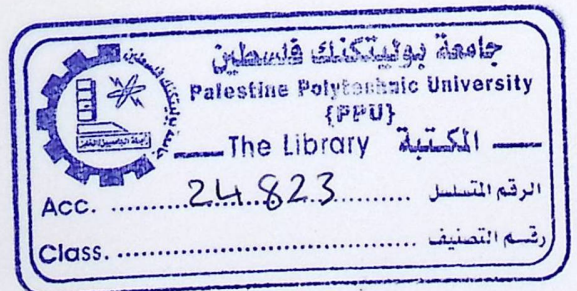
الجنس ذكر أنثى

إختار

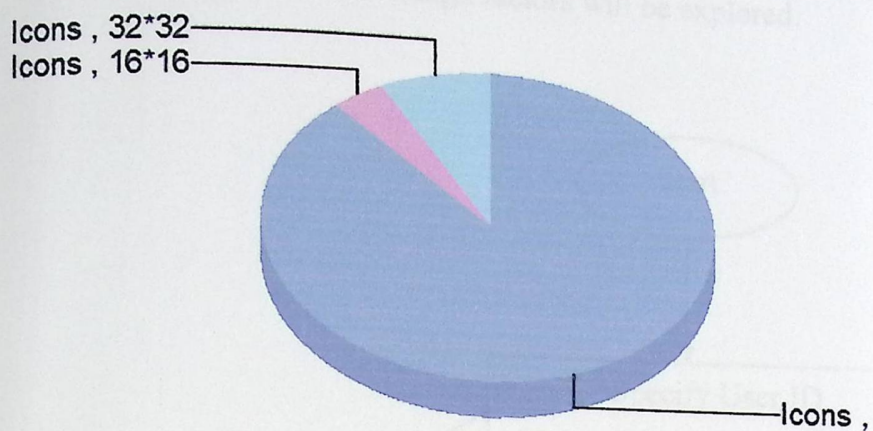
الجنسية

رقم الهوية

Figure (4-3): input screen



Output Screens:



| | | |
|---------------|----|--------|
| Icons , | 44 | 88.0% |
| Icons , 16*16 | 2 | 4.0% |
| Icons , 32*32 | 4 | 8.0% |
| Total: | 50 | 100.0% |

Figure (4-4): Output screen

4.6) Flow Charts

Here the flowchart of each of the design factors will be explored.

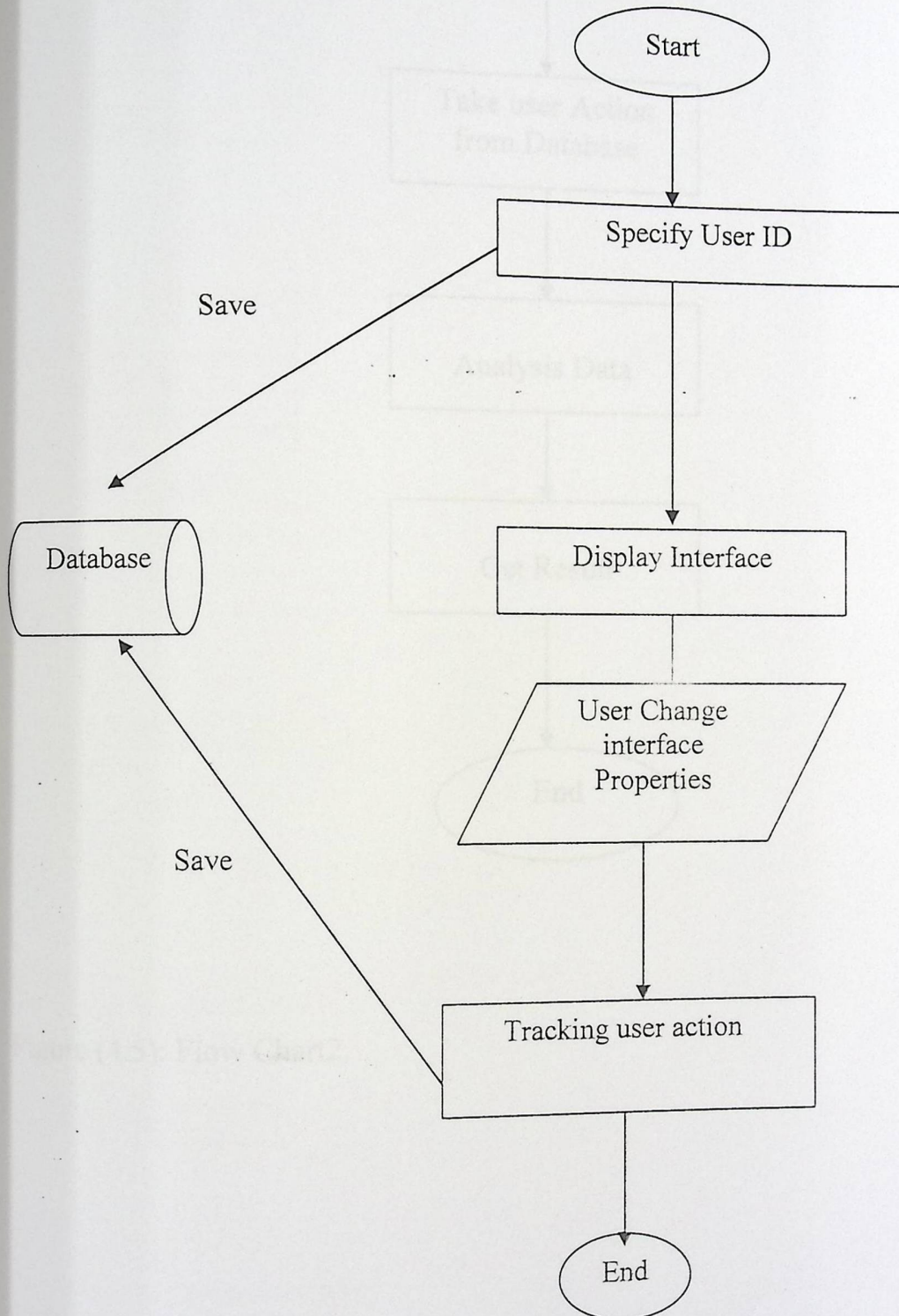


Figure (4.4): Flow Chart1.

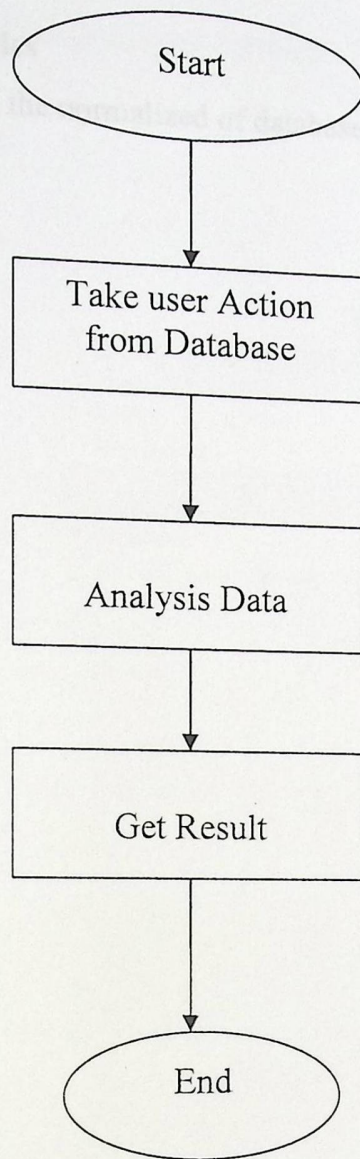


Figure (4.5): Flow Chart2.

4.7 Database design

4.1 Normalized database tables

Tables 4.1 to 4.5 below shows the normalized of database tables.

Table 4.1 users table

| Field name |
|--------------|
| UserNo |
| ComputerName |

Table 4.2 users Actions

| Field name |
|-------------------|
| UserActionNo |
| MainContrlName |
| ActionNumber |
| ActionDescription |
| UserChoice |
| UserNo |

Table 4.3 Actions Table

| Field name |
|--------------|
| ActionNumber |
| ActionName |

Table 4.4 Questions table

| Field name |
|--------------|
| QuestionNo |
| QuestionText |

Table 4.5 Questionnaire table

| Field name |
|------------|
| UserNo |
| Question |
| Answer |

Figure 4.6 shows the five tables of prototype database and how they are related to each other.

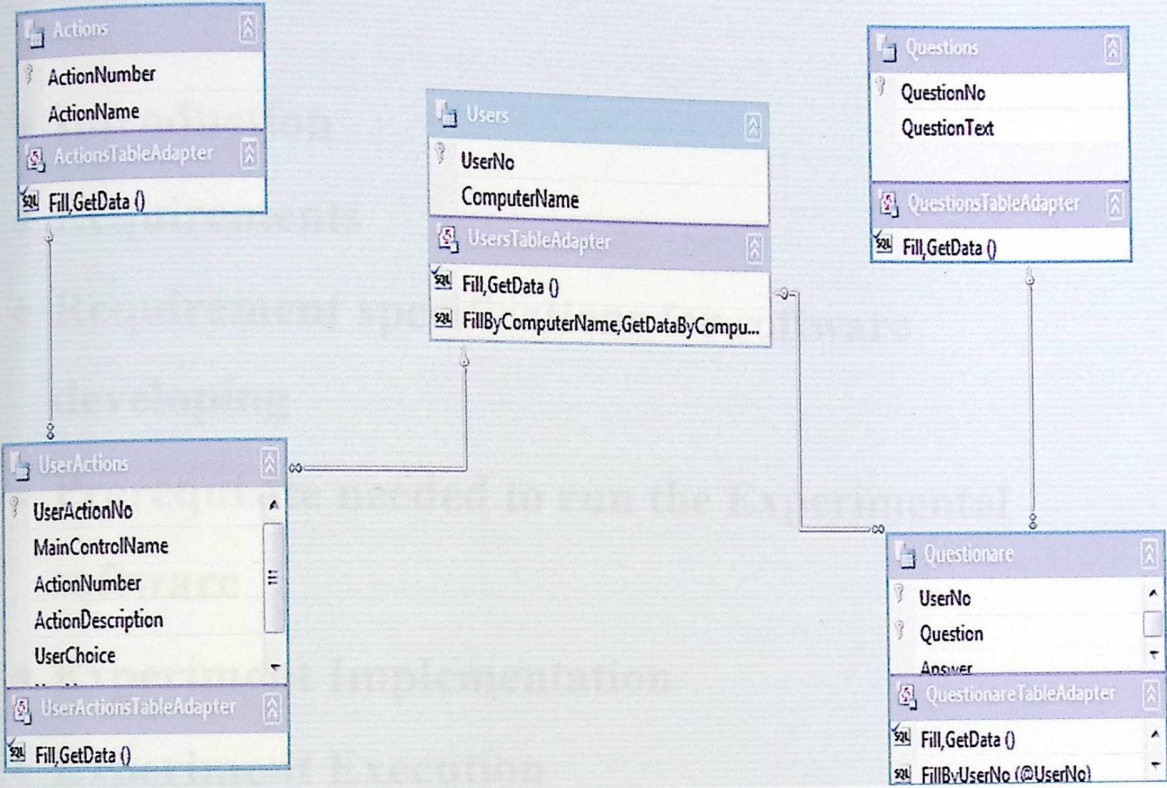


Figure (4-6): Database Design

Chapter Five

Implementation

- ◆ Introduction
- ◆ Requirements
- ◆ Requirement specifications for software developing
- ◆ Prerequisite needed to run the Experimental software
- ◆ Experiment Implementation
- ◆ Experiment Execution

5.1 Introduction

Humans interact with computers in many ways, and the interface between human and the computers they use is strictly to facilitate this interaction. So this project tests the most important design factors and explained behaviour and affective impression to the user.

This chapter discusses the implementation phase which is essential phase and more technical details of this project also the tools and physical equipment.

The equipments are:-

1. Microsoft windows XP Professional.

It provides the advanced productivity tools your needs, and gives you the power to manage, deploy, and support your computing environment. Windows XP Professional is designed to provide a reliable foundation that provides the ultimate in security and privacy, while offering great performance and ease of use.

2. Microsoft visual studio 2008.

Microsoft Visual Studio is an Integrated Development Environment (IDE) from Microsoft. It can be used to develop console and graphical user interface applications along with Windows Forms applications, web sites, web applications, and web services.

The project team chose this program for the presence of features that are largely supported in dealing with the database required by the program, where its ability to handle data effectively and rapidly without causing errors affect the system's effectiveness.

3. Microsoft SQL server 2005.

Microsoft SQL server 2005 is a program from the SQL server 2005 software provides the system requirements that we need in the process of creating, access, and database management system. which works on database management and control whether to

add or modify, or delete data, and this tool is used to create tables that will be used in the system and perform data entry for tables or modification of it, The strength and effectiveness of the system in the interdependence of all of Microsoft Visual Studio.NET 2008, SQL Server in an integrated manner without causing any disruption of the system or data

4. Microsoft office 2003.

It includes word processor, to complete a full documentation, Microsoft PowerPoint, and Microsoft Office Visio 2003 for the work of all the necessary designs and drawings and shapes.

5. Desktop Computer: Desktop computer needed to apply the detection prototype on it, and to store information and make processes on them.the table (1.1) hardware requirement specification as shown in page 7.

5.2 Prerequisite needed to run the Experimental software:

1. Microsoft SQL server 2005:

2. .Net Framework3.5

The .NET Framework Data Provider for SQL Server (SqlClient) adds new support for file stream and sparse column capabilities in SQL Server 2008.

5.3 Experiment Implementation

To implement the experiment the program need a physical and software requirements on the two ways to implement it.

5.4.1 First Alternative using server and client

1. Physical Requirements for server

Table (5.1): Server specification

Source :(Computer Center, Palestine Polytechnic University)

| Minimum Requirements | Recommended Requirements |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|
| <p>SERVER specifications</p> <p>support up to 2 processors,</p> <p>Memory: Up to 32 GB PC2-5300 Fully Buffered DIMMs ,</p> <p>Internal Storage 1.168TB (with optional hard drives)</p> | <p>2-CPU with 3000 MHz clock speed each, 3GB RDRAM, 100 GB hard disk space, Motherboard Intel, CD drives read/write.</p> |

2- Requirements for SQL Server

This table shows hardware requirements for installing and running SQL Server

Table (5-2): SQL Server requirements

Source: (Microsoft Company Web Site,

<http://www.microsoft.com/Sqlserver/2005/en/us/system-requirements.aspx>)

| SQL Server 2005 | Processor type | Processor speed | Memory (RAM) |
|---------------------------------|--------------------------------------------|---------------------------------------------------------------------|------------------------------------------------------------------|
| SQL Server 2005 Express Edition | Pentium III-compatible processor or higher | Minimum: 500 MHz Recommended: 1 GHz or higher Minimum: 192 MB | Recommended: 512 MB or more Maximum: Operating system maximum |

For client:

Physical Requirements

1. Personal computer

This table shows hardware requirements for the client Personal computer:

Table (5-3) Requirements for the client Personal computer

Source :(Computer Center in Palestine Polytechnic University)

| Personal Computer | Minimum Requirements | Recommended |
|-------------------|-------------------------------|--------------------------------------------------------|
| For client | P4 1.73GHZ, 2GB RAM, 40 GB HD | P4 3000 MHz clock speed ,512 MB RAM 80 GB hard disk |

5.4.2 Second Alternative:

Using *Friends of Fawzi Kawash Information Technology Center of Excellence (FFKITCE)*. Server that hosts E-learning to host the experiment software.

5.4.3 Third Alternative:

Using a portable Personal computer to implement the experiment.

This alternative will be used if the client server alternative failed. The students will use this laptop to do the experiment.

Table (5-4) Laptop specifications

| Computer | Specifications |
|-------------------|-----------------------------------------------------------------------------------------|
| Portable Computer | Intel(R) Pentium(R) Dual CPU T2390 @1.86GHz 1.87 GHz , 2GB RAM 140GB Hard Disk |

5.4 Experiment Execution:

The study sample was about 500 students from Palestine Polytechnic University. This sample included all computer majors in the university:

- Information Technology Students
- Information Systems Students
- Computer Engineering Students
- Computer Science Students.

Then the respondents were 150 students, and we take 96 results for 10 students from Computer Science, 10 students from Computer Engineering, 20 students from Information Systems and 56 students from Information Technology.

The experimental interface was designed to be installed on one of the university servers in order to make it easy to install it on many computers in the university labs and then perform the experiment. But unfortunately many problems appear during our attempts to do that, one of these problems was the high amount of Viruses that attacks the computers and deny the computers from being connected to the program database.

After that the research team went to the admin of the computer center in the university and asked him to allow putting our software on the university server.

However the research team went to the admin of Friends of Fawzi Kawash IT Center (FFKITC) and asks them to allow putting our experimental software on the E-Learning Server.

When we tried the first alternative the admin of the computer center allow us to use the server and when we reach the stage of putting the database on there server we face a problem that our database works on SQLServer2005 but the university servers use SQLServer2000 and this difference make it impossible to put our program database on their server.

Time was very critical, so we went quickly to second alternative and the admin of (FFKITC) tell us that the only solution they have is to let us prepare a computer with high quality and put our software on it and then to put this computer on their network for a short period. Also this solution wasn't very helpful.

Lastly the project team decides to use one laptop that contains the experimental interface and the database. Then the students were asked to make the experiment and then to fill an electronic questionnaire about the changes they made.

After the completion of data collecting from students who belongs to different colleges the data was exported to an excel sheet to be analyzed later.

Chapter 6

Prototype Testing

◆ Introduction

◆ Prototype Unit Testing

- Text
- Dialog Box
- Color
- Menu
- Toolbar

6.1 Introduction:

Most important step that must do before experiment the interface is testing, to insure it works as expected. And to insure that it meet all required functionality.

The testing process includes four levels:

- Prototype units testing
- Module testing
- Subsystem testing
- Integration testing

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Figure (6-1) login screen.

6.2 Prototype units testing

At this type of testing the design factors are divided into five main parts (Text, Dialog Box, Color, Menu, and Toolbar), that each one of them will be tested separately to insure that each one is meet its requirement.

6.2.1 Text Testing:

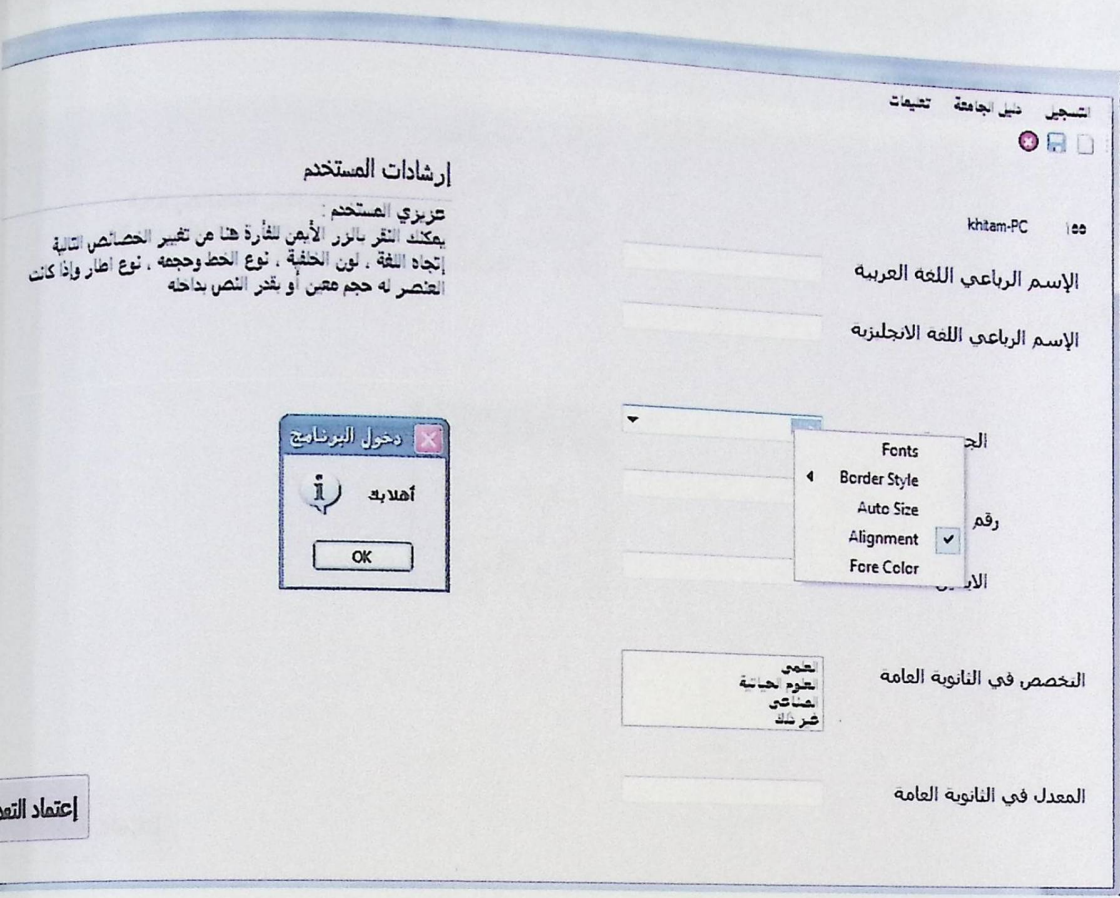


Figure (6-2) text properties

The testing includes the following properties: fonts, border style, and alignment, fore color.

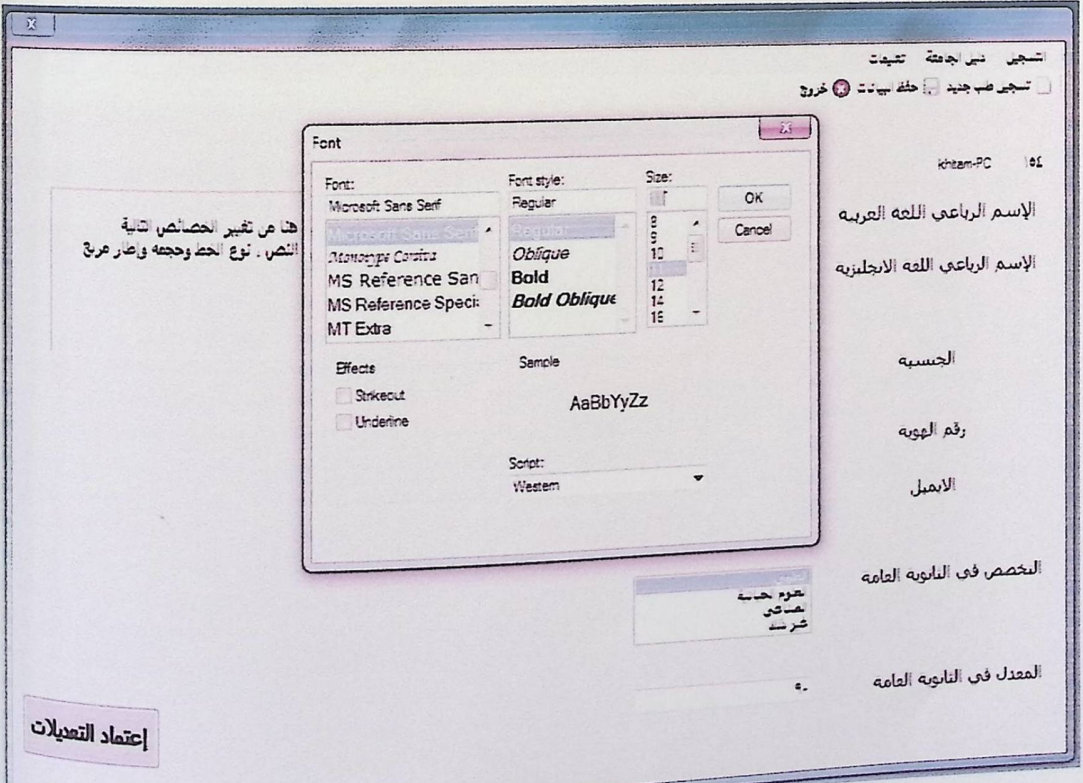


Figure (6-3) Choosing to change Text Font

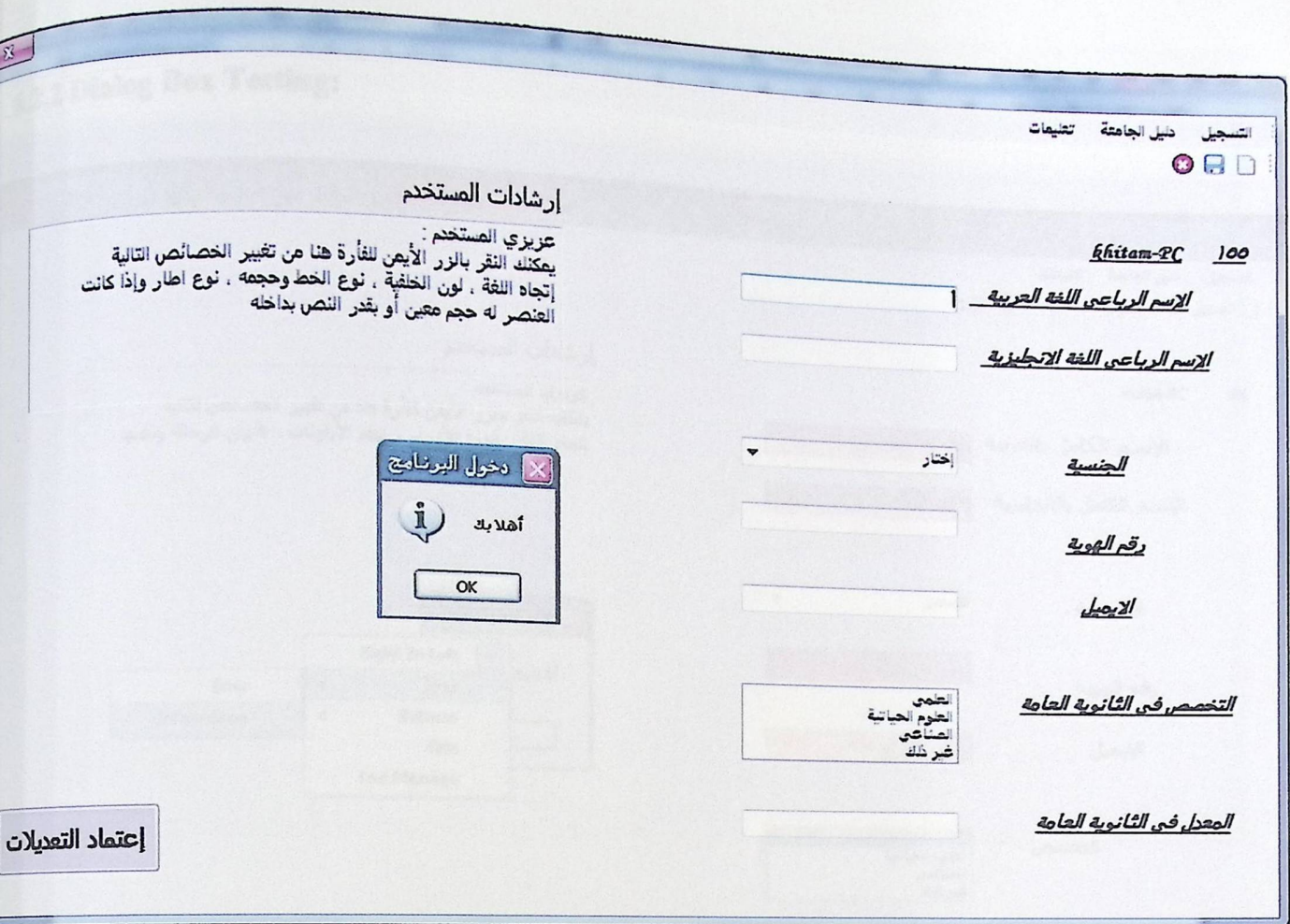


Figure (6-4): Changing appears on text font

6.2.2 Dialog Box Testing:

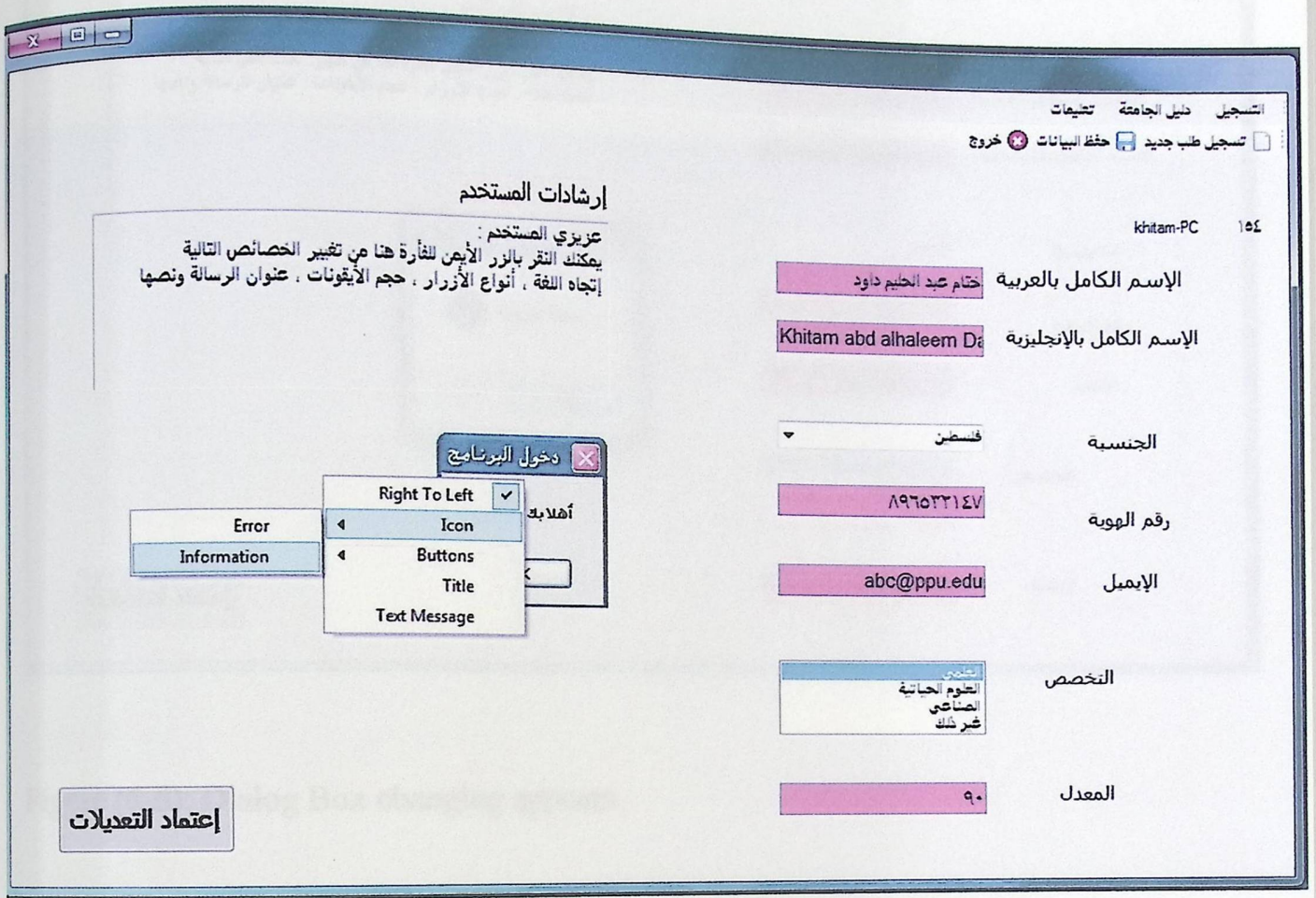


Figure (6-5) Dialog Box properties and choosing icon type.

Dialog Box testing include the following properties: (Text message, Title, Button, and Right to left)

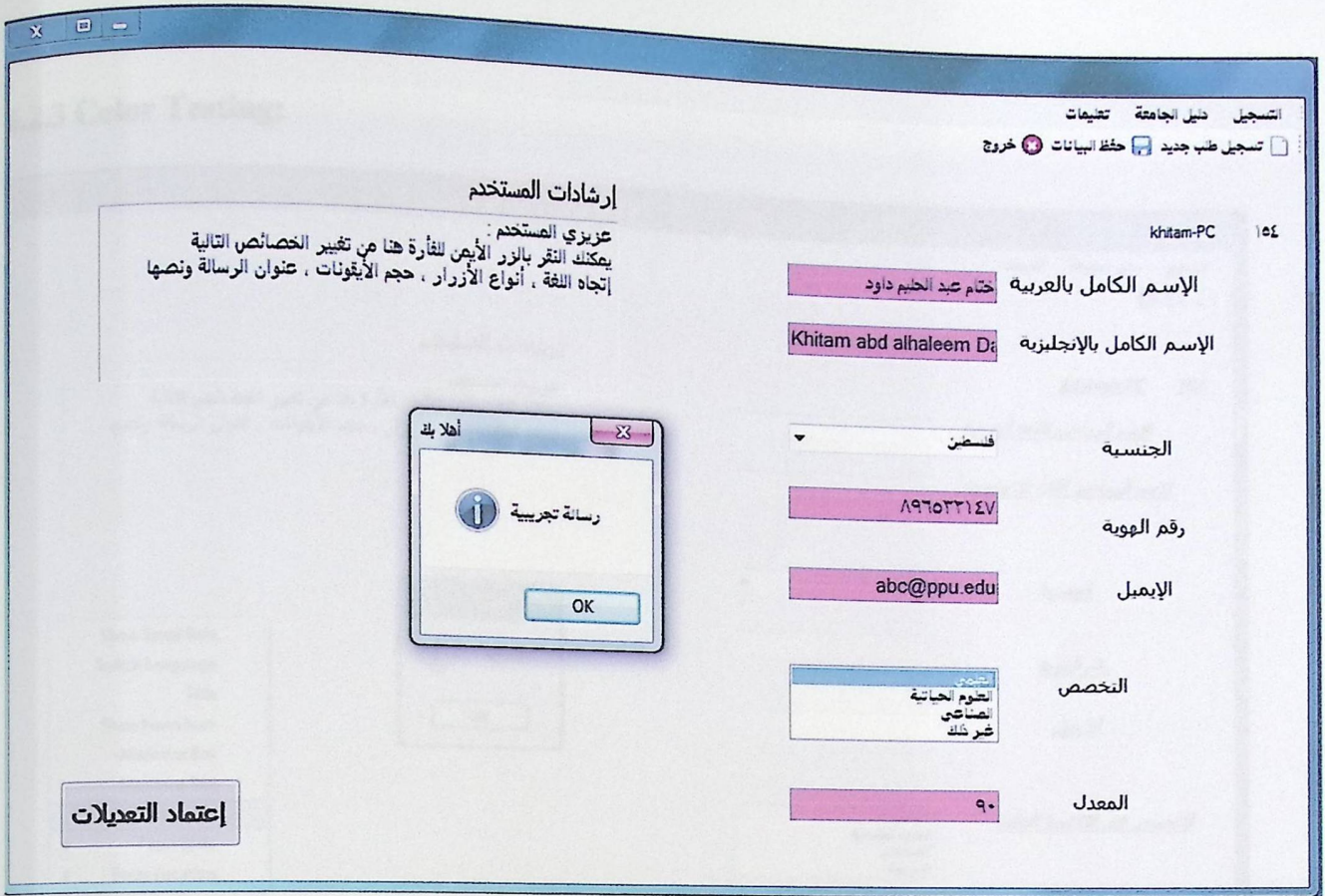


Figure (6-6): Dialog Box changing appears.

6.2.3 Color Testing:

The screenshot shows a software window titled "إرشادات المستخدم" (User Instructions) with a title bar containing "fitam-2C 100". The window contains a form with several input fields and labels. A context menu is open over the form, listing properties: "Show Scroll Bars", "Switch Language", "Title", "Show Form Icon", "Maximize Box", "Minimize Box", "Form Color" (highlighted), "Form State", and "Form Location". A small dialog box titled "دخول البرنامج" (Program Entry) with the text "أهلا به" (Welcome) and an "OK" button is also visible. The form fields are labeled as follows:

- الإسم الرباعي اللغة العربية (Arabic Family Name)
- الإسم الرباعي اللغة الانجليزية (English Family Name)
- الجنسية (Nationality)
- رقم الهوية (ID Number)
- الانجيل (Bible)
- التخصص في الثانوية العامة (Specialization in High School)
- المعدل في الثانوية العامة (Average in High School)

Additional text in the form includes "عزيزي المستخدم:" (Dear user), "يمكنك النقر بالزر الأيمن للفأرة هنا من تغيير الخصائص التالية" (You can click the right mouse button here to change the following properties), "إتجاه اللغة ، أنواع الأزرار ، حجم الأيقونات ، عنوان الرسالة ونصها" (Direction of language, types of buttons, icon size, message title and text), "إختيار" (Select), "أهلا به" (Welcome), and "اعتماد التعديلات" (Depend on modifications).

Figure (6-7) Form Properties choosing to change form color.

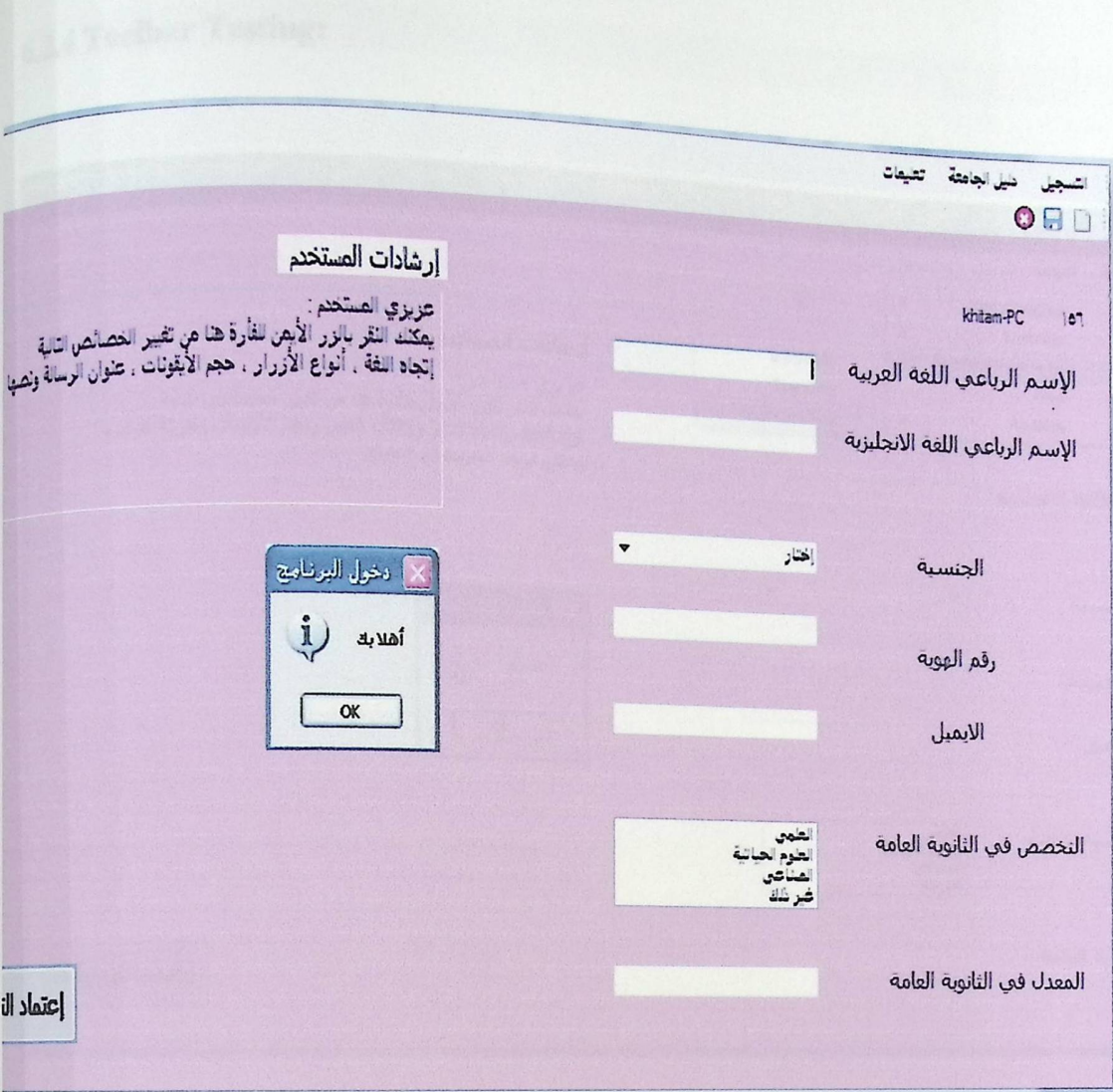


Figure (6-9) Color Changing.

6.2.4 Toolbar Testing:

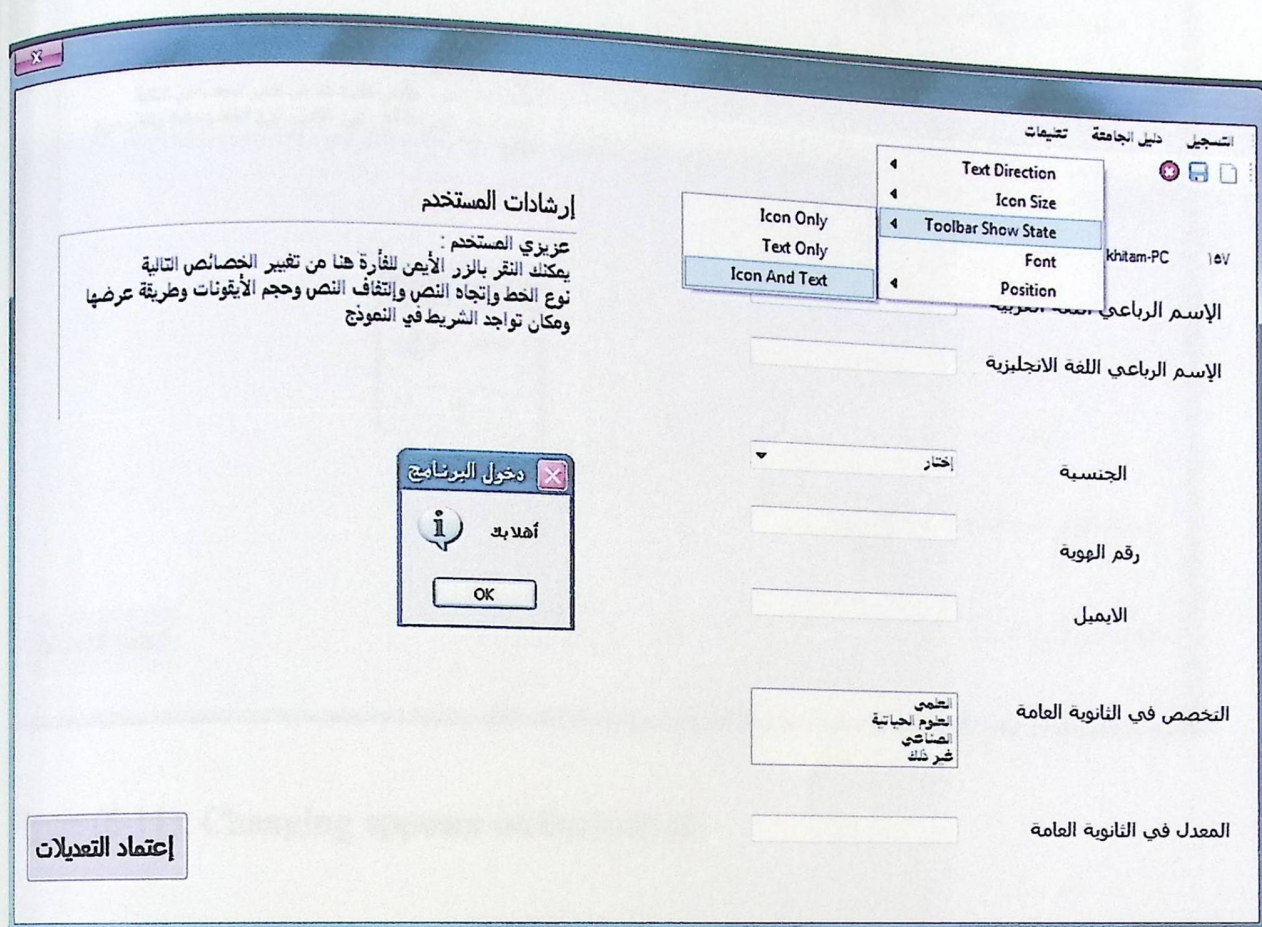


Figure (6-10): Toolbar properties and select toolbar state to change.

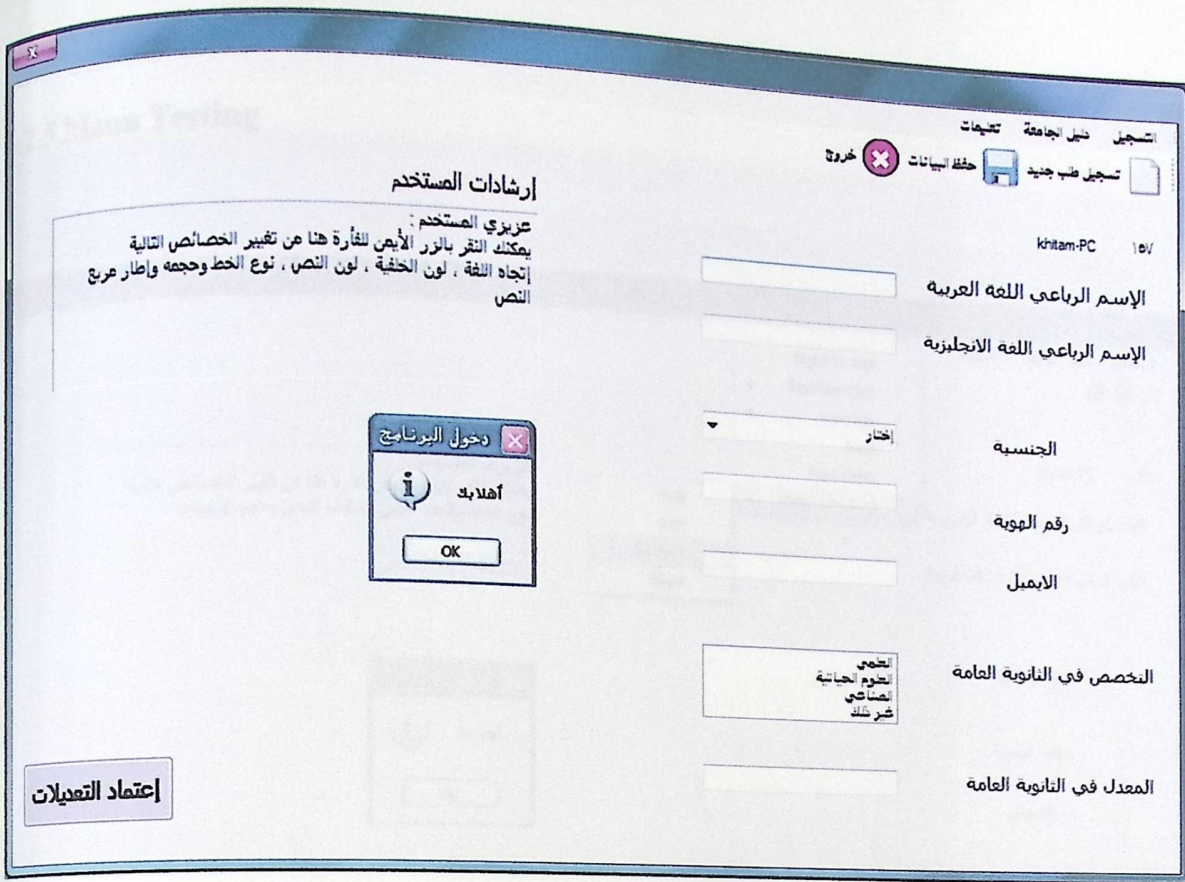


Figure (6-11): Changing appears on the toolbar.

Figure (6-12): Menu Properties changing to change menu location.

Menu using include: (right to left, text direction, icon size, font, font color, menu location).

6.2.5 Menu Testing

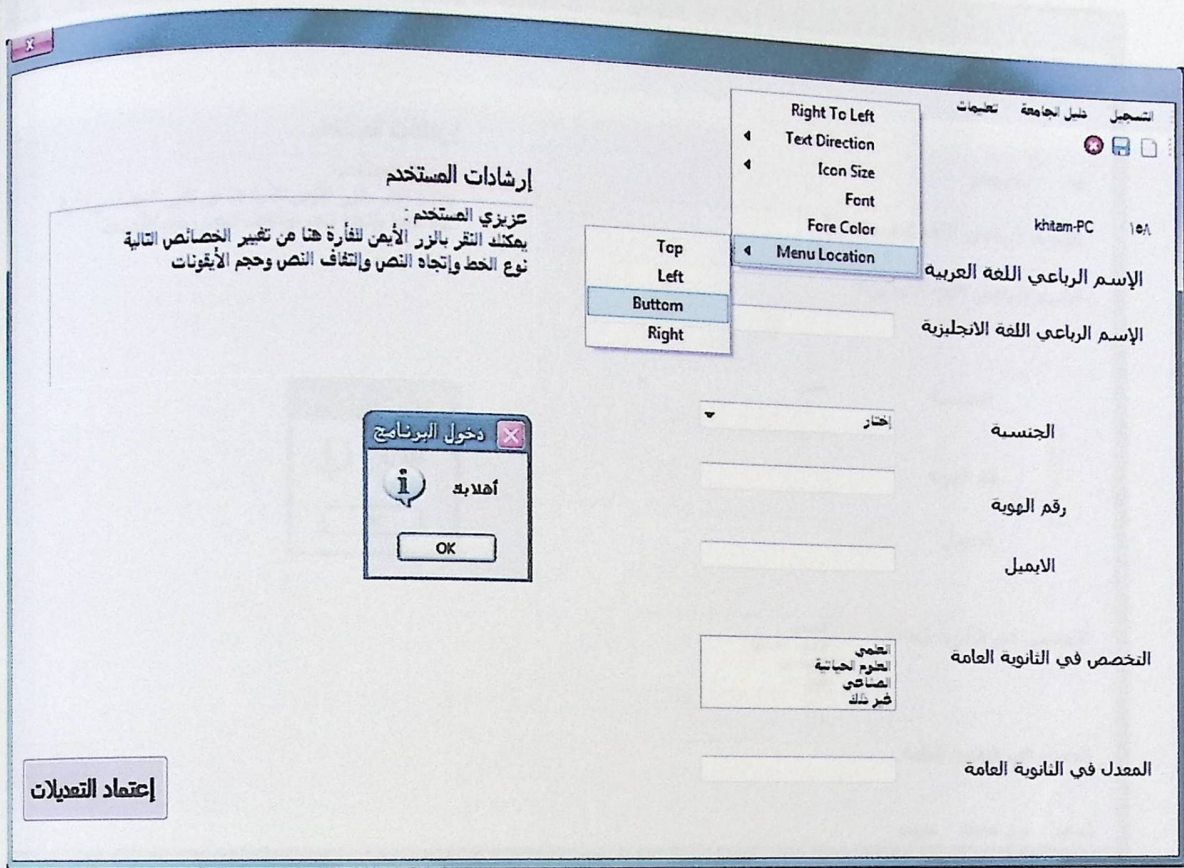


Figure (6-12): Menu Properties choosing to change menu location.

Menu testing include: (right to left, text direction, icon size, font, fore color, menu location).

6.2.5 Menu Testing

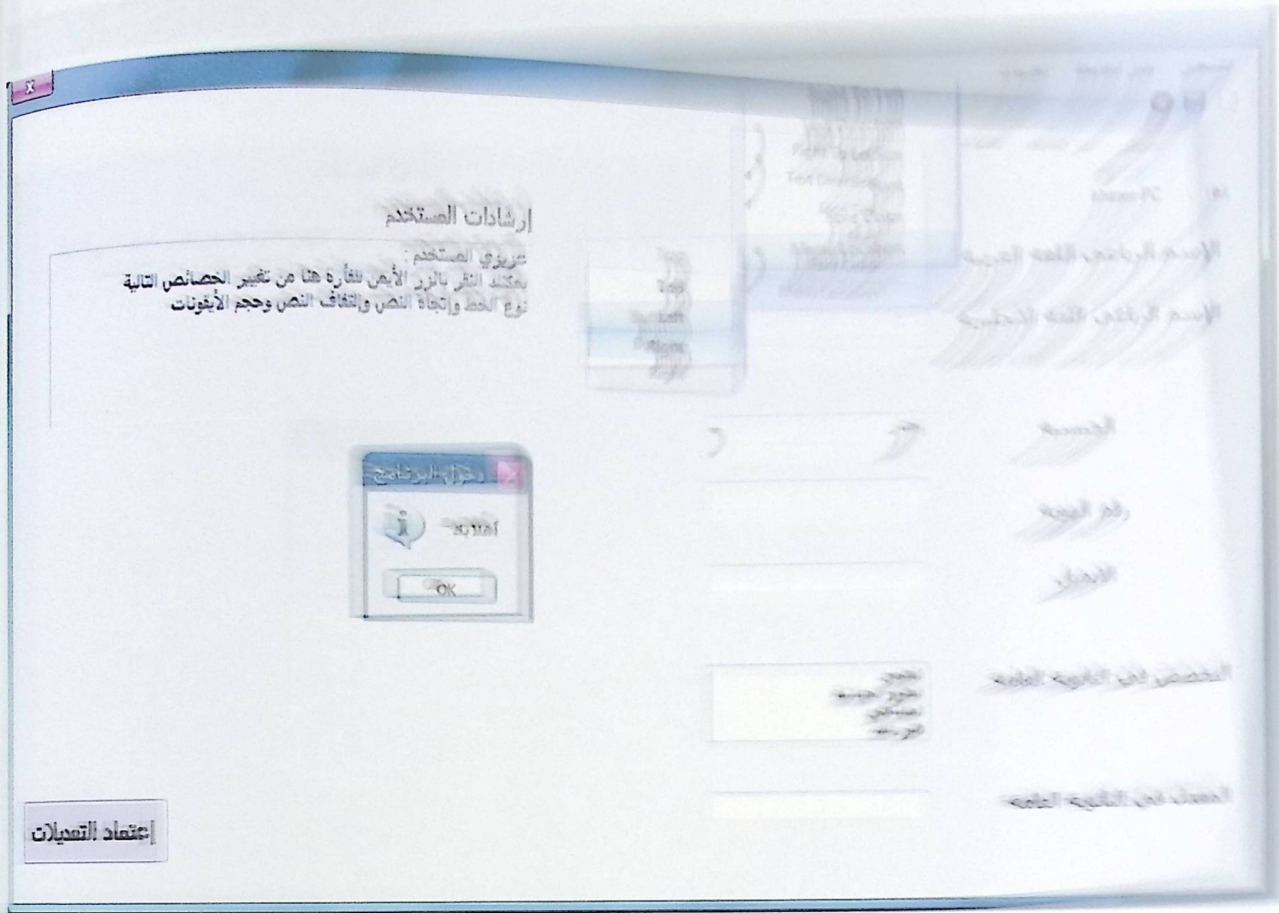


Figure (6-12): Menu Properties, choosing to change menu location.

Menu testing include: (right to left, text direction, icon size, font, fore color, menu location).

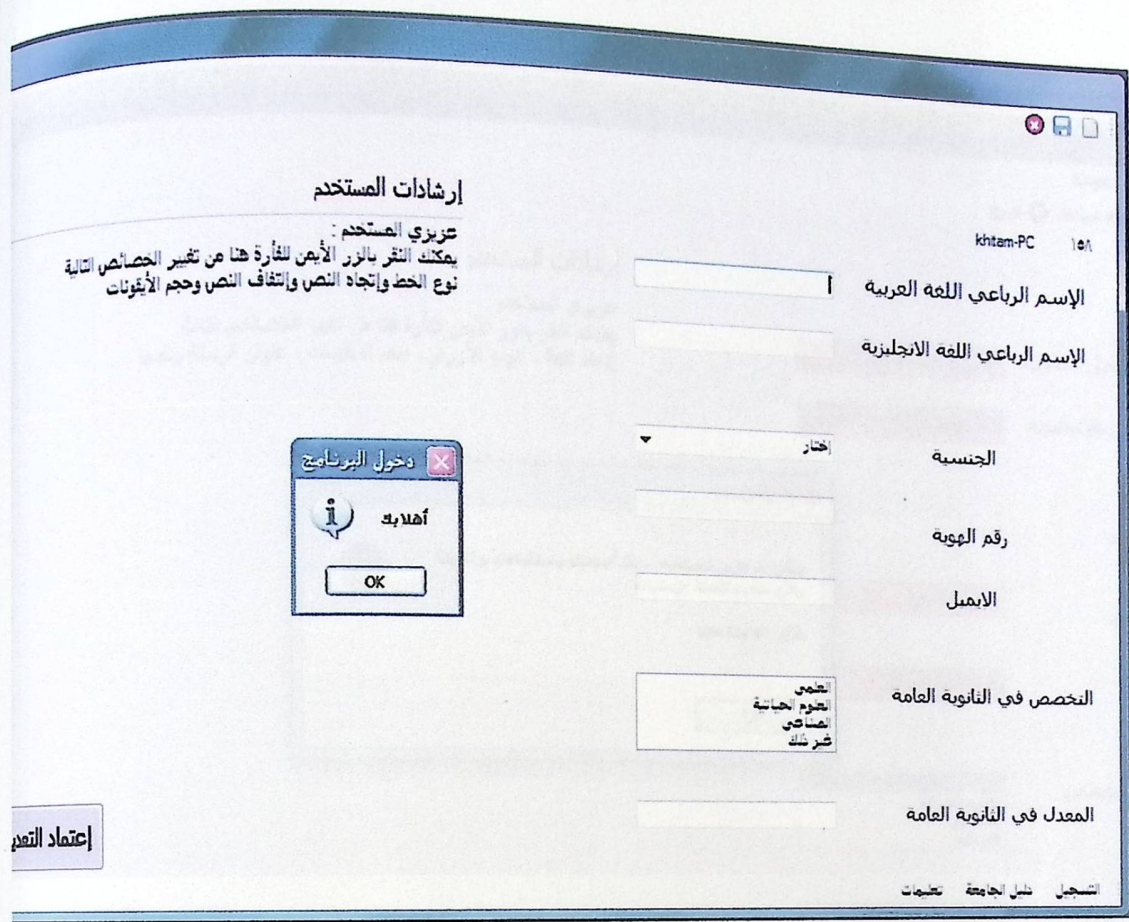


Figure (6-13): changes appear on menu location.

Figure (6-14): Thanking dialog box.

After the user finished the experiment and click the submit button this dialog box appear.

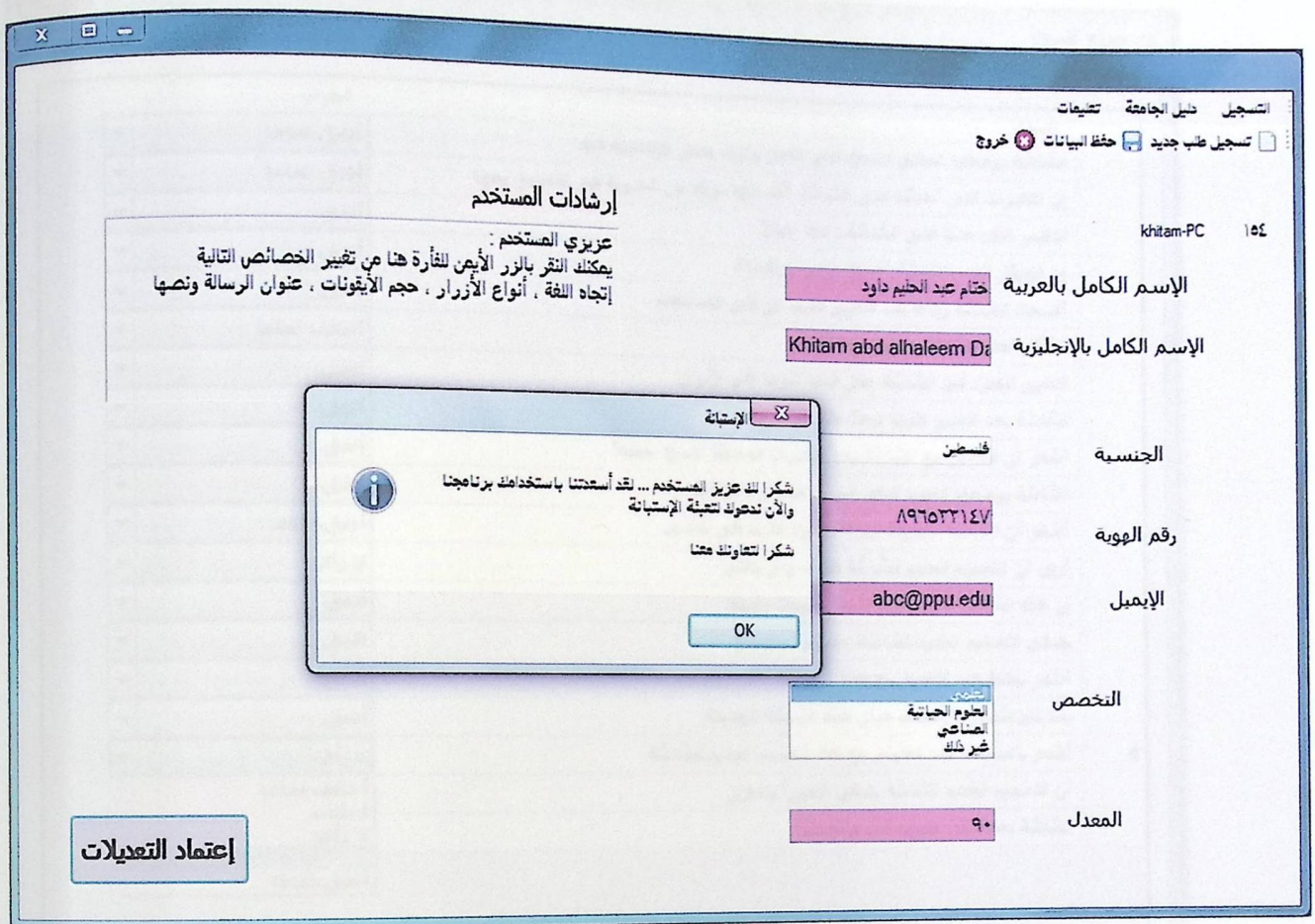


Figure (6-14): Thanking dialog box.

Electronic Questionnaire appears and the user has to fill it according to his changes on the experimental interface.

نموذج الإستبانة

| السؤال | الجواب |
|----------------------------------------------------------------------------|-------------|
| الشاشة بوضعها الحالي تشجع على العمل وتزيد معدل الإنتاجية فيه | أنتفي تماما |
| إن التغيرات التي أحدثت على الشاشة أكسبتها نوعاً من الحيوية في التعامل معها | أنتفي تماما |
| التغيير الذي حدث على الشاشة زادها جمالا | أنتفي |
| إن الهيكل العام للشاشة أصبح مناسباً لرغباتك | أنتفي |
| أصبحت الشاشة رائعة بعد التغيير عليها من قبل المستخدم | أختلف تماما |
| الشكل العام للشاشة يدعو إلى الكتابة | أنتفي |
| التغيير الجديد في الشاشة جعل فيها تنوعاً في الألوان | أنتفي |
| الشاشة بعد التغيير عليها تبعث على الأمل والتفاؤل | أنتفي |
| أشعر أن التعامل مع الشاشة بعد التغيرات المحدثة أصبح ممتعاً | أنتفي |
| الشاشة بوضعها الجديد تدعو إلى الإحساس بالنشاط | أنتفي تماما |
| أشعر أن الشاشة الجديدة تساندي وتدعم ما في نفسي | لا رأي |
| أرى أن التصميم الجديد للشاشة هادف وذو معنى | أنتفي |
| إن هذه الشاشة بعد التغيير عليها أصبحت مفيدة | أنتفي |
| بضفي التصميم الجديد للشاشة إحساساً بالإبداع | أنتفي |
| أشعر بمتعة عند التعامل مع هذه الشاشة | أنتفي |
| يبتابني شعور بالإعجاب حيال هذه الشاشة الجديدة | لا رأي |
| أشعر بالسعادة عند تعاملتي مع هذا التصميم الجديد للشاشة | أختلف تماما |
| أن التصميم الجديد للشاشة بضفي شعوراً بالحزن | أختلف |
| الشاشة بعد التغيير عليها أصبحت قاتمة | لا رأي |
| | أنتفي تماما |

Figure (6-15) Electronic Questionnaire.

Chapter Seven

Results and Recommendations

- ◆ Introduction
- ◆ Data Analysis
- ◆ Questionnaire Analysis
- ◆ Results
- ◆ Recommendations
- ◆ Future Work

7.1 Introduction

In the previous chapters the study model and each design factors was discussed. Then the experiment was designed and implemented.

In this chapter the results of the experiment will be explored. Also the recommendations will be mentioned.

7.2 Data Analysis

7.2.1 Menu Properties

-Left to right for text direction

Table (7-1) Text direction property

| value | Number of user |
|---------------|----------------|
| Left To right | 23 |
| Right to left | 73 |

The results presented in table(7-1) shows that the 23 respondents select the text direction of the menu to be left to right, where 73 respondents selects the text direction to be right to left.

This means that the majority of the respondents prefer the text direction of the menu to be right to left, so HCI designers can get benefits from the results.

-Menu Direction

Table (7-2) Menu Direction property

| Value | Number of user |
|--------------|----------------|
| Horizontal | 45 |
| Vertical 90 | 20 |
| Vertical 270 | 31 |

The results presented in table (7-2) shows that the 45 respondents select the Menu Direction to be Horizontal, 20 respondents selects the Menu Direction to be Vertical 90, and 31 respondents selects the Menu Direction to be Vertical 270.

This means that the majority of the respondents prefer Menu Direction to be Horizontal, so HCI designers can get benefits from the results.

-Icon size

Table (7-3) Icon Size property

| Value | Number of user |
|-------|----------------|
| 16*16 | 26 |
| 24*24 | 34 |
| 32*32 | 26 |

The results presented in table (7-3) shows that the 26 respondents select the Icon Size to be 16*16, 34 respondents select the Icon Size to be 24*24, and 26 respondents selects the Icon Size to be 32*32.

This means that the majority of the respondents prefer Size to be 24*24, so HCI designers can get benefits from the results.

-Font

Table (7-4) Font Type property

| Value | Number of user |
|------------------------------|----------------|
| Microsoft Sans Serif regular | 14 |
| Tahoma | 13 |
| Corbol | 8 |
| Arial | 15 |
| Batang | 2 |
| Vreinda | 11 |
| Andlus | 6 |
| Cambria | 7 |
| Book Antiqua | 3 |
| Time New Roman | 5 |
| Segoe Print bold | 3 |
| Calibri | 4 |
| Dotum | 1 |
| Wingdings | 2 |
| Consolas | 3 |

The results presented in table (7-4) shows that the majority of the respondents prefer Font Type to be Arial, so HCI designers can get benefits from the results.

-Fore color

Table (7-5) Fore Color property

| Value | Number of user |
|------------|----------------|
| Black | 78 |
| GohstWhite | 6 |
| Green | 2 |
| Brown | 3 |
| Violet | 7 |

The results presented in table (7-5) shows that the 78 respondents select the Fore Color to be Black, 6 respondents select the Fore Color to be GohstWhite , 2 respondents select the Fore Color to be Green, 3 respondents select the Fore Color to be Brown, and 7 respondents selects the Fore Color to be Violet.

This means that that the majority of the respondents prefer Fore Color to be black, so HCI designers can get benefits from the results.

-Location

Table (7-6) Location property

| Value | Number of user |
|--------|----------------|
| Top | 50 |
| Left | 18 |
| Right | 15 |
| Bottom | 12 |

The results presented in table (7-6) shows that the 50 respondents choose the location to be Top, 18 respondents choose the location to be Left, 15 respondents choose the location to be Right and 12 respondents choose the location to be Bottom.

This means that that the majority of the respondents choose the location to be Top, so HCI designers can get benefits from the results.

7.2.2 Form Properties

-Title

Table (7-7) Title property

| Value | Number of Users |
|-------------------|-----------------|
| Write Title | 51 |
| Don't Write Title | 45 |

The results presented in table (7-7) shows that the 51 respondents write Title and 45 respondents select not to write the title.

This means that that the majority of the respondents write title, so HCI designers can get benefits from the results.

-Show Form Icon

Table (7-8) Show Form Icon property

| Value | Number of Users |
|----------------------|-----------------|
| Show Form Icon | 61 |
| Don't Show Form Icon | 35 |

The results presented in table (7-8) shows that the 61 respondents choose to show form icon and 35 respondents select not to show form icon.

This means that that the majority of the respondents write title, so HCI designers can get benefits from the results.

-Minimize box

Table (7-9) Minimize box property

| Value | Number of Users |
|--------------|-----------------|
| Minimize Box | 39 |
| Maximize Box | 55 |

The results presented in table (7-9) shows that the 39 respondents choose to minimize box and 55 respondents select to maximize box.

This means that the majority of the respondents choose to maximize box, so HCI designers can get benefits from the results.

-Show scroll Bar

Table (7-10) Show scroll bar property

| Value | Number of Users |
|------------|-----------------|
| Show | 46 |
| Don't Show | 50 |

The results presented in table (7-10) shows that the 46 respondents choose to Show scroll Bar and 50 respondents choose to not to Show scroll Bar.

This means that that the majority of the respondents choose to not to Show scroll bar, so HCI designers can get benefits from the results.

-Form Title

Table (7-11) Show scroll bar property

| Value | Number of user |
|-------------------|----------------|
| Write Title | 49 |
| Don't Write Title | 47 |

The results presented in table (7-11) shows that 49 respondents choose to write form title, where 47 do not choose to write form title.

This means that that the majority of the respondents choose to write form title, so HCI designers can get benefits from the results.

-Color

Table (7-12) Color property

| Value | Number of user |
|-------------|----------------|
| Coral | 3 |
| Pink | 4 |
| Navay | 3 |
| Peach puff | 7 |
| Grey | 26 |
| Silver | 5 |
| Sea Green | 5 |
| Powder blue | 10 |
| Red | 4 |
| Morton | 7 |
| black | 3 |
| Light blue | 15 |
| teal | 4 |

The results presented in table (7-12) shows that the majority of the respondents prefer Form Color to be Grey, so HCI designers can get benefits from the results.

7.2.3 Dialog box Properties

-Left To right

Table (7-13) Left to Right property

| Value | Number of user |
|---------------|----------------|
| Left to right | 42 |
| Right to left | 54 |

The results presented in table (7-13) shows that 42 respondents choose Left To right, where 54 do not choose right to left.

This means that that the majority of the respondents choose right to Left, so HCI designers can get benefits from the results.

-Dialog box Icon size

Table (7-14) Left to Right property

| Value | Number of user |
|-------|----------------|
| 16*16 | 19 |
| 24*24 | 33 |
| 36*36 | 43 |

The results presented in table (7-14) shows that the majority of the respondents choose 36*36, so HCI designers can get benefits from the results.

-Dialog Box Buttons

Table (7-15) Dialog box button property

| Value | Number of user |
|--------------------|----------------|
| ok | 13 |
| yes no | 33 |
| yes no cancel | 31 |
| ok cancel | 13 |
| Abort, try, ignore | 7 |

The results presented in table (7-15) shows that the majority of the respondents choose yes no button, so HCI designers can get benefits from the results.

-Text Message

Table (7-16) Dialog Text message property

| Value | Number of user |
|--------------|----------------|
| change | 42 |
| Don't change | 54 |

The results presented in table (7-16) shows that the majority of the respondents choose not to change text message, so HCI designers can get benefits from the results.

7.2.4 Tool bar Properties

-Tool bar direction

Table (7-17) Toolbar direction property

| Value | Number of user |
|--------------|----------------|
| Horizontal | 56 |
| Vertical 90 | 23 |
| Vertical 270 | 17 |

The results presented in table (7-17) shows that the majority of the respondents choose the toolbar direction to be Horizontal, so HCI designers can get benefits from the results.

-Icon size

Table (7-18) Toolbar icon size property

| Value | Number of user |
|-------|----------------|
| 16*16 | 24 |
| 24*24 | 44 |
| 32*32 | 28 |

The results presented in table (7-18) shows that the majority of the respondents choose the toolbar size to be 24*24, so HCI designers can get benefits from the results.

-State

Table (7-19) Toolbar State property

| value | Number of user |
|----------------|----------------|
| Icon only | 14 |
| Text only | 24 |
| Icons and text | 58 |

The results presented in table (7-19) shows that the majority of the respondents choose the toolbar state to be Icon and text, so HCI designers can get benefits from the results.

-Position

Table (7-20) Toolbar Position property

| Value | Number of user |
|--------|----------------|
| Top | 45 |
| left | 12 |
| bottom | 22 |
| right | 17 |

The results presented in table (7-20) shows that the majority of the respondents choose the toolbar position to be Top, so HCI designers can get benefits from the results.

7.2.5 Text box Properties

- Left To right

Table (7-21) Direction property

| value | Number of user |
|---------------|----------------|
| Left To right | 23 |
| Right to left | 73 |

The results showed in table (7-21) shows that the majority of the respondents choose the text in the textbox to be right to left, so HCI designers can get benefits from the results.

-Border style

Table (7-22) Border Style property

| value | Number of user |
|--------|----------------|
| Normal | 35 |
| 3d | 28 |
| Single | 33 |

The results showed in table (7-22) shows that the majority of the respondents choose the border style in the textbox to be Normal, so HCI designers can get benefits from the results.

7.2.5 Text box Properties

-Left To right

Table (7-21) Direction property

| value | Number of user |
|---------------|----------------|
| Left To right | 23 |
| Right to left | 73 |

The results showed in table (7-21) shows that the majority of the respondents choose the text in the textbox to be right to left, so HCI designers can get benefits from the results.

-Border style

Table (7-22) Border Style property

| value | Number of user |
|--------|----------------|
| Normal | 35 |
| 3d | 28 |
| Single | 33 |

The results showed in table (7-22) shows that the majority of the respondents choose the border style in the textbox to be Normal, so HCI designers can get benefits from the results.

Font

Table (7-23) Font property

| Number of user | value |
|----------------------|-------|
| Tahoma | 9 |
| Consolas | 3 |
| Arial | 22 |
| Estrangelo Edessa | 1 |
| Candara | 4 |
| Microsoft Sans Serif | 18 |
| andluis | 2 |
| Segoe Print bold | 7 |
| Time New roman | 6 |
| Dotum | 5 |
| Cambria | 5 |
| Arabic Typesetting | 3 |
| Wingdings | 3 |
| Book Antiqua | 5 |
| Malgun Gothic | 3 |

The results in table (7-23) shows that the majority of the respondents choose the Font in the textbox to be Arial, so HCI designers can get benefits from the results.

Table (7-24) Text Color property

| Number of Users | values |
|-----------------|--------|
| Black | 28 |
| LightGrey | 5 |
| teal | 12 |
| Orchid | 7 |
| yellow green | 6 |
| Tomato | 8 |
| slatblue | 5 |
| Peach puff | 8 |
| coral | 12 |
| Pink | 5 |

The results in table (7-24) shows that the majority of the respondents choose the Text color in the textbox to be Black, so HCI designers can get benefits from the results.

7.3 Data Analysis

7.3.1 Interactivity

When asking members of the sample during the experiment about the Interactivity the results show that the answers average was 1.8 according to Lickert scale, which is composed of five degrees (1 fully agree, 2 agree, 3 No opinion , 4, disagree, 5 completely disagree).

According to this Scale an average less than 3 means positive attitude and more than 3 means negative attitude towards Interactivity.

So, 1.8 means that there is a positive attitude towards interactivity in the new interface that the user made.

7.3.2 Vividness

When asking members of the sample during the experiment about the Vividness, the results show that the answers average was 1.67

And according to Likert Scale we considered that less than 3 means positive attitude and more than 3 means negative attitude.

So, this means that there is a positive attitude towards Vividness in the new interface that the user made.

7.3.3 Beauty

When asking members of the sample during the experiment about the Beauty, the results show that the answers average was 1.7

And this means that there is a positive attitude towards Beauty in the new interface that the user made.

7.3.4 Structure

When the members of the sample was asked about Beauty, the results show that the answers average was 1.8

And this means that there is a positive attitude towards the Structure in the new interface that the user made.

7.3.5 Adorable

When the members of the sample was asked about Adorable in the interface , the results show that the answers average was 1.88

And this means that there is a positive impression toward adorability in the new interface that the user made.

7.3.6 Tense

When the members of the sample was asked about Tense in the interface, the results show that the answers average was 3.6

And this means that there is a negative impression toward Tense in the new interface that the user made.

7.3.7 Colorful

When the members of the sample was asked about Colorful in the new interface , the results show that the answers average was 1.8

And this means that there is a positive impression toward Colorful in the new interface that the user made.

7.3.8 Hopeful

When the members of the sample was asked about Hopeful in the new interface, the results show that the answers average was 1.8

And this means that there is a positive impression toward hopeful in the new interface that the user made.

7.3.9 Pleasure

When the members of the sample was asked about Pleasure in the new interface, the results show that the answers average was 1.7

And this means that there is a positive impression toward pleasure in the new interface that the user made.

7.3.10 Activation

When the members of the sample was asked about Activation in the new interface, the results show that the answers average was 1.8

And this means that there is a positive impression toward Activation in the new interface that the user made.

7.3.11 Attribution

When the members of the sample was asked about Attribution in the new interface, the results show that the answers average was 1.9

And this means that there is a positive impression toward Attribution in the new interface that the user made.

7.3.12 Meaningful

When the members of the sample was asked about Meaningful in the new interface, the results show that the answers average was 1.9

And this means that there is a positive impression toward Meaningful in the new interface that the user made.

7.3.13 Useful

When the members of the sample was asked about Useful in the new interface, the results show that the answers average was 2.1

And this means that there is a positive impression toward Useful in the new interface that the user made.

7.3.14 Creative

When the members of the sample was asked about Creative in the new interface, the results show that the answers average was 1.9

And this means that there is a positive impression toward Creative in the new interface that the user made.

7.3.15 Fun

When the members of the sample was asked about Fun in the new interface, the results show that the answers average was 1.86

And this means that there is a positive impression toward Fun in the new interface that the user made.

7.3.16 Elated

When the members of the sample was asked about Elated from the new interface that include their, the results show that the answers average was 1.77 on lickert scale.

This means that there is a positive impression toward new interface that the user made.

7.3.17 Happy

When the members of the sample was asked about happiness in the new interface, the results show that the answers average was 1.9

And this means that there is a positive impression toward new interface that the user made. So, the users can describe the new interface that it is happy according to the core affects.

7.3.18 Sad

When the members of the sample was asked about sadness in the new interface, the results show that the answers average was 4.3

And this means that the users can describe the new interface that it is not sad according to the core affects.

7.3.19 Gloomy

When the members of the sample was asked about Gloomy in the new interface, the results show that the answers average was 4.7

And this means that the users can describe the new interface that it is not Gloomy according to the core affects.

The research team notes that the results of user tracking during using the interface in the Experiment (as shown in the following table 7.1) lead to make the user happy and elated during using the interface.

Table(7-25): The effect of factors.

| Factor | Affect |
|---------------|----------|
| Interactivity | positive |
| Vividness | positive |
| Beauty | positive |
| Structure | Positive |
| Adorable | Positive |
| Colorful | Positive |
| Pleasure | Positive |
| Attribution | Positive |
| Useful | Positive |
| Fun | Positive |
| Creative | Positive |
| Meaningful | Positive |
| Activation | Positive |
| Hopeful | Positive |
| Elated | Positive |
| Happy | Positive |

The design factors included in the interface depending on the experiment results are

7.4 Recommendations

- 1) We recommend the developers to take these results into consideration when designing and developing computer application.
- 2) We strongly recommend researchers and student who interest in this field to complete this project and do the future work.

7.5 Future Work

Making an Interface compiler, this compiler will filter each interface if it was designed according to the guide lines and user preferences or not. It will be amazing idea if it done.

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حضرة الأستاذ المحترم :-

يقوم فريق البحث بعمل دراسة حول تأثير عناصر التصميم المستخدمة في بناء التطبيقات الحاسوبية على مدى تفاعل واستجابة المستخدم لهذه التطبيقات وتأثيرها على الانطباعات الوجدانية لديه، ولتحقيق ذلك فإن فريق البحث يسعى في هذه المرحلة لتحديد عناصر التصميم الأكثر أهمية من أجل بناء التطبيق الذي يتلاءم معها، لذلك يرجى إبداء رأيكم حول مدى أهمية هذه العناصر من خلال الإجابة على أسئلة هذه الإستمارة، مع ملاحظة أن المعلومات التي تدلون بها سوف تستخدم لأغراض البحث العلمي فقط، وسوف يتم التعامل معها على أساس تجميعي، ولن يتم التعرف من خلالها على الشخص الذي رصد هذه المعلومات.

شاكرين لكم حسن تعاونكم واهتمامكم في دعم المسيرة الأكاديمية والتعليمية في الوطن .

فريق البحث:

أنوار رجيبي ختام داود رهام ابريوش

تحت إشراف: أ. اسماعيل رومي

يرجى وضع إشارة (x) في المربع حسب ما تراه مناسباً في تصميم تطبيقات الحاسوب والتفاعل معها .

| العبارة | اختلف تماماً | اختلف | لا يوجد رأي | اتفق تماماً |
|----------------------------------------------------------------------|--------------|-------|-------------|-------------|
| من المهم الدمج بين أكثر من طريقة من وسائل الإعلام مثل الصوت والصورة. | | | | |
| يمثل الصوت عنصراً هاماً في التطبيقات الحاسوبية . | | | | |
| يشكل النص في التطبيقات البرمجية العنصر الأهم . | | | | |
| يعتبر وضوح الشاشة عاملاً ثانوياً عند تصميم التطبيقات الحاسوبية . | | | | |
| وضع الكثير من الأيقونات في التطبيقات الحاسوبية يسهل التعامل معها . | | | | |

| العبرة | اختلف تماماً | أختلف | لا يوجد رأي | اتفق |
|-------------------------------------------------------------------------------------------------------|--------------|-------|-------------|------|
| من الضروري وجود القوائم بأنواعها في التطبيقات الحاسوبية. | | | | |
| إن وضوح الشاشة يعتبر عنصراً أساسياً في عرض التطبيقات الحاسوبية. | | | | |
| إتاحة التغيير في خصائص شاشة التطبيقات الحاسوبية حسب رغبة المستخدمين. | | | | |
| من المهم تحديد عدد العناصر الموجودة في القوائم. | | | | |
| طريقة ترتيب العناصر في القائمة يسرع استخدام هذه التطبيقات. | | | | |
| إن طبيعة الألوان من حيث الدرجات والمزج بينها لا يؤثر في المستخدم أثناء تعامله مع التطبيقات الحاسوبية. | | | | |
| لا بد من الاهتمام بأبعاد مربع الحوار عند استخدامه في التطبيقات الحاسوبية. | | | | |
| استخدام مربعات الحوار في التطبيقات الحاسوبية يزعج المستخدم. | | | | |
| من المهم دراسة مربع الحوار عند استخدامه في التطبيقات الحاسوبية. | | | | |
| عند استخدام رموز وصور للأيقونات من البيئة المحيطة يسهل استخدامها وفهم عملها. | | | | |
| الألوان تؤثر في التصميم العام للتطبيقات الحاسوبية من حيث درجة الألوان وطرق المزج بينها | | | | |
| لا يمكن وجود تطبيق من التطبيقات الحاسوبية دون وجود الأزرار. | | | | |
| تناسق الألوان لا يؤثر في انطباع المستخدم عند تعامله مع التطبيقات الحاسوبية. | | | | |
| تعتبر أشرطة الأدوات من العناصر الحيوية في التطبيقات الحاسوبية | | | | |

نهاية الإستمارة - شكراً لحسن تعاونكم

الإستبانة الثانية

يرجى وضع إشارة (x) في المربع حسب ما تراه مناسباً في تصميم تطبيقات الحاسوب والتفاعل معها .

| البيان | لا يوجد رأي | | أختلف تماماً | | العبارة |
|--------|-------------|-------|--------------|--------|-----------------------------------------------------------------------------|
| | اتفق | أختلف | أختلف | تماماً | |
| | | | | | الشاشة بوضعها الحالي تشجع على العمل وتزيد معدل الإنتاجية فيه |
| | | | | | إن التغييرات التي أحدثت على الشاشة أكسبتها نوعاً من الحيوية في التعامل معها |
| | | | | | التغيير الذي حدث على الشاشة زادها جمالاً |
| | | | | | إن الهيكل العام للشاشة أصبح مناسباً لرغباتك |
| | | | | | أصبحت الشاشة رائعة بعد التغيير عليها من قبل المستخدم |
| | | | | | الشكل العام للشاشة يدعو إلى الكآبة |
| | | | | | التغيير الجديد في الشاشة جعل فيها تنوعاً في الألوان |
| | | | | | الشاشة بعد التغيير عليها تبعث على الأمل والتفاؤل في نفس المستخدمين |
| | | | | | أشعر أن التعامل مع الشاشة بعد التغييرات المحدثة أصبح ممتعاً |
| | | | | | الشاشة بوضعها الجديد تدعو إلى الإحساس بالنشاط |
| | | | | | أشعر أن الشاشة الجديدة تساندني وتدعم ما في نفسي |
| | | | | | أرى أن التصميم الجديد للشاشة هادف وذو معنى |

| | | | | |
|--|--|--|--|-------------------------------------------------------|
| | | | | إن هذه الشاشة بعد التغيير عليها أصبحت مفيدة |
| | | | | يضيفي التصميم الجديد للشاشة إحساساً بالإبداع |
| | | | | أشعر بمتعة عند التعامل مع هذه الشاشة |
| | | | | ينتابني شعور بالإعجاب حيال هذه الشاشة الجديدة |
| | | | | أشعر بالسعادة عند تعاملي مع هذا التصميم الجديد للشاشة |
| | | | | أن التصميم الجديد للشاشة يضيفي شعوراً بالحزن |
| | | | | الشاشة بعد التغيير عليها أصبحت قاتمة |

نهاية الاستمارة - شكراً لحسن تعاونكم



جامعة اly
كلية العلوم و
المعلوماتية
قسم تكنولوجيا المعلومات

Appendix B

Formal Letter



بسم الله الرحمن الرحيم

الحمد لله
والصلاة والسلام
على رسول الله

بسم الله الرحمن الرحيم
الحمد لله والصلاة والسلام على رسول الله
والصلاة والسلام على سيدنا محمد وآله

والحمد لله رب العالمين

بسم الله الرحمن الرحيم
الحمد لله
والصلاة والسلام
على رسول الله



التاريخ : 28/10/2009

حضرات السادة / بنك القاهرة عمان المحترمين

الموضوع : مساعدة الطلبة

السلام عليكم ورحمة الله وبركاته،

يرجى من حضرتكم التكرم بمساعدة الطالبات:

ختام داود

رهام بريوش

أنوار الرجبي

وهن من طالبات الدائرة، لإنجاز المشروع الخاص بمساق " مشروع التخرج ".
شاكرين لكم حسن تعاونكم معنا في خدمة الطلبة والمجتمع.

وتفضلوا بقبول فائق الاحترام

رئيس دائرة تكنولوجيا المعلومات

د. محمد الدشت



التاريخ : 29/12/2009

حضرات السادة / مركز الحاسوب المحترمين

الموضوع : مساعدة الطالبة

السلام عليكم ورحمة الله وبركاته،

يرجى من حضرتكم التكرم بمساعدة الطالبات:

ختام داود

رهام بريوش

أنوار الرجبي

وهن من طالبات دائرة تكنولوجيا المعلومات، لإنجاز المشروع الخاص بمساق مشروع التخرج بعنوان:

"The Effect of Design Factors on Effective Impressions", وذلك باستخدام اجهزة الجامعة في جمع البيانات

اللازمة حسب ما ترونها مناسبة.

شاكرين لكم حسن تعاونكم معنا في خدمة الطلبة والمجتمع.

وتفضلوا بقبول فائق الاحترام

رئيس دائرة تكنولوجيا المعلومات

د. محمد النخيت

Appendix C

Design Factors Results Tables

| User number | left to right | Dialog box icon | buttons | Text message | Title |
|-------------|---------------|-----------------|---------|--------------|-------|
| 41 | 2 | 3 | 1 | 1 | 1 |
| 42 | 2 | 3 | 2 | 2 | 1 |
| 43 | 1 | 2 | 2 | 1 | 2 |
| 47 | 2 | 3 | 1 | 2 | 1 |
| 66 | 1 | 2 | 1 | 2 | 2 |
| 70 | 2 | 3 | 1 | 1 | 2 |
| 73 | 2 | 3 | 4 | 1 | 1 |
| 74 | 2 | 3 | 4 | 2 | 1 |
| 75 | 2 | 3 | 4 | 2 | 1 |
| 76 | 2 | 3 | 4 | 1 | 1 |
| 77 | 2 | 3 | 4 | 2 | 1 |
| 79 | 1 | 2 | 2 | 1 | 1 |
| 80 | 1 | 2 | 2 | 2 | 2 |
| 83 | 2 | 1 | 2 | 2 | 1 |
| 86 | 1 | 1 | 2 | 1 | 1 |
| 89 | 2 | 2 | 1 | 1 | 1 |
| 90 | 1 | 2 | 1 | 2 | 1 |
| 91 | 2 | 1 | 2 | 2 | 1 |
| 92 | 1 | 1 | 2 | 2 | 1 |
| 93 | 2 | 2 | 3 | 1 | 1 |
| 96 | 2 | 2 | 4 | 2 | 2 |
| 99 | 1 | 3 | 1 | 1 | 1 |
| 102 | 2 | 1 | 1 | 2 | 1 |
| 103 | 1 | 2 | 5 | 1 | 2 |
| 104 | 1 | 3 | 3 | 2 | 1 |
| 105 | 2 | 3 | 3 | 1 | 1 |
| 106 | 2 | 1 | 3 | 2 | 1 |
| 107 | 1 | 1 | 1 | 2 | 2 |
| 108 | 2 | 1 | 2 | 1 | 1 |
| 109 | 1 | 2 | 2 | 2 | 1 |
| 110 | 2 | 1 | 2 | 1 | 1 |
| 111 | 1 | 3 | 2 | 2 | 1 |
| 112 | 2 | 2 | 3 | 1 | 2 |
| 115 | 1 | 2 | 3 | 1 | 1 |
| 116 | 1 | 3 | 1 | 2 | 1 |
| 117 | 2 | 2 | 1 | 1 | 1 |
| 118 | 2 | 1 | 2 | 1 | 1 |
| 120 | 1 | 3 | 5 | 1 | 1 |
| 121 | 2 | 2 | 3 | 1 | 1 |
| 122 | 1 | 1 | 1 | 1 | 2 |
| 124 | 2 | 1 | 1 | 1 | 1 |
| 125 | 1 | 1 | 1 | 2 | 2 |
| 126 | 2 | 2 | 2 | 2 | 1 |
| 128 | 2 | 3 | 2 | 1 | |

| | | | | | |
|-----|---|---|---|---|---|
| 129 | 1 | 1 | 2 | 2 | 1 |
| 130 | 1 | 2 | 2 | 2 | 1 |
| 131 | 5 | 3 | 2 | 2 | 1 |
| 132 | 5 | 3 | 2 | 2 | 2 |
| 133 | 1 | 2 | 2 | 2 | 1 |
| 134 | 2 | 1 | 2 | 1 | 2 |
| 135 | 1 | 2 | 3 | 2 | 1 |
| 136 | 2 | 2 | 3 | 1 | 2 |
| 137 | 1 | 3 | 3 | 2 | 2 |
| 138 | 2 | 2 | 3 | 1 | 2 |
| 139 | 2 | 1 | 5 | 2 | 1 |
| 140 | 2 | 2 | 3 | 1 | 1 |
| 141 | 2 | 2 | 3 | 2 | 1 |
| 142 | 5 | 3 | 3 | 1 | 1 |
| 143 | 1 | 3 | 3 | 1 | 2 |
| 144 | 1 | 2 | 3 | 2 | 1 |
| 146 | 1 | 3 | 2 | 1 | 1 |
| 147 | 2 | 2 | 3 | 2 | 1 |
| 148 | 2 | 3 | 1 | 1 | 1 |
| 149 | 2 | 3 | 1 | 2 | 1 |
| 150 | 5 | 3 | 1 | 1 | 1 |
| 152 | 2 | 3 | 1 | 2 | 2 |
| 153 | 1 | 2 | 5 | 1 | 2 |
| 154 | 2 | 3 | 2 | 2 | 2 |
| 160 | 1 | 2 | 3 | 1 | 2 |
| 162 | 2 | 3 | 2 | 2 | 2 |
| 163 | 1 | 2 | 3 | 1 | 2 |
| 164 | 1 | 3 | 2 | 2 | 2 |
| 165 | 2 | 3 | 1 | 2 | 2 |
| 168 | 1 | 1 | 2 | 1 | 2 |
| 169 | 2 | 1 | 2 | 1 | 2 |
| 170 | 2 | 1 | 2 | 2 | 2 |
| 171 | 1 | 2 | 3 | 1 | 1 |
| 172 | 1 | 3 | 5 | 2 | 1 |
| 173 | 5 | 3 | 2 | 1 | 1 |
| 174 | 1 | 3 | 2 | 2 | 1 |
| 176 | 1 | 3 | 2 | 1 | 1 |
| 177 | 2 | 3 | 2 | 2 | 1 |
| 180 | 1 | 3 | 3 | 1 | 1 |
| 181 | 2 | 3 | 3 | 2 | 1 |
| 182 | 2 | 3 | 2 | 1 | 1 |
| 183 | 1 | 2 | 2 | 1 | 1 |
| 184 | 1 | 1 | 2 | 2 | 1 |
| 185 | 2 | 1 | 1 | 1 | 1 |
| 186 | 1 | 1 | 2 | 2 | 1 |
| 187 | 2 | 2 | 5 | 2 | 1 |

| | | | | | |
|-----|---|---|---|---|---|
| 188 | 2 | 3 | 2 | | |
| 189 | 1 | 2 | 3 | 2 | 1 |
| 190 | 1 | 1 | 2 | 1 | 1 |
| 191 | 2 | 3 | 2 | 2 | 1 |
| 192 | 2 | 3 | 1 | 1 | 1 |
| 193 | 5 | 1 | 2 | 1 | 1 |
| | | | | 2 | 1 |

Form

| User number | show scroll bar | color | Title | show form icon | minimize box | maximize box |
|-------------|-----------------|--------------|-------|----------------|--------------|--------------|
| 41 | 1 | coral | 1 | 1 | 2 | 2 |
| 42 | 2 | Pink | 1 | 1 | 1 | 2 |
| 43 | 2 | Color [Navy] | 2 | 1 | 2 | 1 |
| 47 | 2 | Peach puff | 1 | 1 | 2 | 2 |
| 66 | 1 | silver | 2 | 2 | 2 | 1 |
| 70 | 2 | sea green | 1 | 2 | 1 | 2 |
| 73 | 1 | apple green | 1 | 1 | 2 | 1 |
| 74 | 1 | whitesmoke | 2 | 1 | 2 | 1 |
| 75 | 1 | yellow | 1 | 1 | 2 | 1 |
| 76 | 1 | white | 1 | 1 | 2 | 1 |
| 77 | 2 | deafult | 1 | 2 | 2 | 1 |
| 79 | 2 | deafult | 1 | 2 | 2 | 1 |
| 80 | 1 | deafult | 1 | 2 | 2 | 1 |
| 83 | 1 | deafult | 1 | 1 | 2 | 1 |
| 86 | 1 | deafult | 1 | 2 | 2 | 1 |
| 89 | 1 | deafult | 1 | 2 | 1 | 2 |
| 90 | 2 | Peach puff | 1 | 2 | 1 | 1 |
| 91 | 2 | silver | 1 | 2 | 1 | 2 |
| 92 | 2 | sea green | 1 | 2 | 1 | 1 |
| 93 | 1 | deafult | 1 | 1 | 1 | 1 |
| 96 | 2 | deafult | 1 | 2 | 1 | 1 |
| 99 | 1 | deafult | 1 | 1 | 2 | 2 |
| 102 | 2 | yellow green | 1 | 2 | 2 | 2 |
| 103 | 2 | black | 1 | 2 | 1 | 1 |
| 104 | 2 | light blue | 1 | 1 | 2 | 2 |
| 105 | 2 | peru | 1 | 1 | 2 | 2 |
| 106 | 2 | black | 1 | 1 | 2 | 1 |
| 107 | 1 | light blue | 2 | 1 | 2 | 2 |
| 108 | 1 | sandybrown | 1 | 1 | 2 | 1 |
| 109 | 2 | cyan | 1 | 1 | 1 | 2 |
| 110 | 2 | pink | 2 | 1 | 1 | 1 |
| 111 | 2 | yellow | 2 | 1 | 2 | 1 |
| 112 | 2 | red | 1 | 1 | 1 | 1 |
| 115 | 2 | yellow green | 1 | 1 | 1 | |
| 116 | 2 | green | 1 | 1 | | |

| | | | | | | |
|-----|---|--------------|---|---|---|---|
| 117 | 1 | hotpink | 1 | 1 | | |
| 118 | 1 | GohstWhite | 1 | 1 | 2 | 1 |
| 120 | 1 | sandybrown | 1 | 1 | 2 | 1 |
| 121 | 1 | teal | 1 | 1 | 1 | 2 |
| 122 | 1 | black | 1 | 1 | 2 | 2 |
| 124 | 2 | yellow | 1 | 1 | 2 | 2 |
| 125 | 2 | coral | 1 | 1 | 2 | 2 |
| 126 | 2 | Pink | 1 | 1 | 1 | 2 |
| 128 | 1 | Color [Navy] | 2 | 1 | 1 | 2 |
| 129 | 1 | Peach puff | 2 | 1 | 1 | 2 |
| 130 | 2 | silver | 2 | 1 | 2 | 2 |
| 131 | 2 | sea green | 2 | 1 | 1 | 2 |
| 132 | 2 | apple green | 2 | 1 | 1 | 2 |
| 133 | 1 | teal | 2 | 2 | 1 | 2 |
| 134 | 1 | deafult | 2 | 2 | 2 | 1 |
| 135 | 2 | Grey | 2 | 2 | 2 | 1 |
| 136 | 1 | silver | 2 | 2 | 1 | 2 |
| 137 | 2 | Pink | 2 | 1 | 1 | 1 |
| 138 | 2 | Peach puff | 2 | 1 | 1 | 2 |
| 139 | 1 | silver | 2 | 2 | 1 | 1 |
| 140 | 2 | sea green | 2 | 2 | 1 | 2 |
| 141 | 2 | yellow green | 2 | 2 | 2 | 1 |
| 142 | 1 | teal | 2 | 2 | 1 | 2 |
| 143 | 2 | light blue | 2 | 2 | 1 | 1 |
| 144 | 1 | light blue | 2 | 2 | 1 | 2 |
| 146 | 2 | yellow green | 2 | 1 | 2 | 1 |
| 147 | 1 | sandybrown | 2 | 1 | 1 | 2 |
| 148 | 1 | light blue | 1 | 1 | 2 | 1 |
| 149 | 1 | black | 1 | 1 | 2 | 2 |
| 150 | 2 | light blue | 1 | 1 | 1 | 1 |
| 152 | 2 | peru | 1 | 1 | 2 | 1 |
| 153 | 1 | Morton | 2 | 1 | 2 | 1 |
| 154 | 1 | plum | 2 | 1 | 1 | 2 |
| 160 | 2 | black | 2 | 1 | 2 | 1 |
| 162 | 1 | yellow green | 2 | 1 | 1 | 2 |
| 163 | 2 | coral | 2 | 1 | 1 | 1 |
| 164 | 2 | Pink | 2 | 1 | 2 | 2 |
| 165 | 2 | Color [Navy] | 2 | 1 | 1 | 1 |
| 168 | 2 | Peach puff | 2 | 1 | 2 | 2 |
| 169 | 2 | silver | 2 | 1 | 1 | 1 |
| 170 | 2 | sea green | 1 | 1 | 2 | 2 |
| 171 | 1 | apple green | 1 | 1 | 1 | 1 |
| 172 | 2 | Violet | 1 | 2 | 2 | 2 |
| 173 | 2 | blue | 1 | 2 | 1 | 1 |
| 174 | 2 | silver | 1 | 2 | 1 | 2 |
| 176 | 1 | teal | 1 | 2 | 1 | 2 |
| 177 | 1 | yellow green | 1 | 2 | 1 | |

| | | | | | | |
|-----|---|---------------|---|---|---|---|
| 180 | 2 | yellow | 1 | 2 | | |
| 181 | 1 | green | 2 | 2 | 2 | 1 |
| 182 | 1 | dark red | 2 | 2 | 1 | 1 |
| 183 | 2 | red | 2 | 1 | 1 | 2 |
| 184 | 1 | Powder blue | 2 | 1 | 1 | 1 |
| 185 | 1 | black | 2 | 1 | 1 | 1 |
| 186 | 1 | coral | 2 | 1 | 1 | 1 |
| 187 | 2 | Pink | 2 | 1 | 1 | 1 |
| 188 | 1 | Color [Navy] | 2 | 1 | 1 | 2 |
| 189 | 2 | Peach puff | 2 | 2 | 1 | 2 |
| 190 | 1 | silver | 2 | 2 | 1 | 1 |
| 191 | 2 | sea green | 2 | 2 | 1 | 1 |
| 192 | 1 | PaleVioletRed | 2 | 1 | 2 | 1 |
| 193 | 2 | green | 1 | 2 | 2 | 1 |

lable text

| User number | Font | border style | auto size | fore color | lef to right |
|-------------|--------------------------------|--------------|-----------|--------------|--------------|
| 41 | Tahoma,9.75 | 1 | 1 | blue | 2 |
| 42 | Tahoma,9.75 | 2 | 1 | Aqua | 2 |
| 43 | Time New roman | 1 | 2 | red | 2 |
| 47 | Segoe Print bold12 | 1 | 2 | deafult | 2 |
| 66 | Consolas,10 | 2 | 1 | deafult | 2 |
| 70 | Wingdings | 1 | 2 | light coral | 2 |
| 73 | Microsoft Sans Serif 18 | 1 | 1 | sandybrown | 2 |
| 74 | Times New Roman,12 | 2 | 1 | hotPink | 2 |
| 75 | Microsoft Sans Serif 18 | 2 | 1 | yellow green | 1 |
| 76 | consola,12 | 2 | 2 | black | 1 |
| 77 | sego print,12 | 2 | 1 | black | 1 |
| 79 | Tahoma,9.75 | 1 | 2 | black | 1 |
| 80 | Book Antiqua,12 | 1 | 1 | black | 2 |
| 83 | corbol,14 | 1 | 1 | sandybrown | 2 |
| 86 | Microsoft Sans Serif regular12 | 1 | 1 | black | 2 |
| 89 | Arial ,12 | 2 | 1 | black | 1 |
| 90 | corbol,14 | 1 | 1 | black | 2 |
| 91 | Microsoft Sans Serif regular12 | 2 | 1 | hotpink | 2 |
| 92 | Arial ,12 | 1 | 1 | sandybrown | 2 |
| 93 | Cambria,10 | 2 | 1 | GohstWhite | 2 |
| 96 | AngsanaUPC,12 | 3 | 1 | black | 2 |
| 99 | Arial ,18 | 1 | 1 | black | 2 |
| 102 | Tahoma,9.75 | 3 | 2 | black | 2 |
| 103 | Tahoma,9.75 | 1 | 1 | black | 2 |
| 104 | Time New roman | 3 | 1 | black | 1 |
| 105 | Segoe Print bold12 | 1 | 1 | hotpink | |

| | | | | | |
|-----|--------------------------------|---|---|--------------|---|
| 106 | Consolas,10 | 1 | 1 | yellow green | 2 |
| | Wingdings | 2 | 1 | sandybrown | 2 |
| 107 | Microsoft Sans Serif 18 | 2 | 1 | black | 2 |
| 108 | Times New Roman,12 | 3 | 2 | black | 2 |
| 109 | Microsoft Sans Serif 18 | 1 | 1 | black | 2 |
| 110 | Times New Roman,12 | 1 | 1 | black | 2 |
| 111 | Microsoft Sans Serif 18 | 1 | 1 | black | 2 |
| 112 | consola,12 | 2 | 1 | light blue | 2 |
| 115 | sego print,12 | 2 | 1 | peru | 2 |
| 116 | corbol,14 | 1 | 1 | black | 2 |
| 117 | Microsoft Sans Serif regular12 | 3 | 1 | light blue | 2 |
| 118 | Arial ,12 | 1 | 2 | sandybrown | 2 |
| 120 | Cambria,10 | 2 | 2 | peru | 2 |
| 121 | Book Antiqua,12 | 2 | 2 | hotpink | 2 |
| 122 | Vreinda,12 | 2 | 2 | GohstWhite | 2 |
| 124 | Andlus,18 | 1 | 1 | light blue | 2 |
| 125 | Tahoma,9.75 | 2 | 2 | sandybrown | 2 |
| 126 | Tahoma,9.75 | 1 | 2 | black | 2 |
| 128 | Time New roman | 1 | 1 | black | 2 |
| 129 | Segoe Print bold12 | 1 | 2 | black | 2 |
| 130 | Consolas,10 | 2 | 1 | black | 2 |
| 131 | Wingdings | 1 | 2 | black | 2 |
| 132 | Microsoft Sans Serif 18 | 1 | 1 | black | 2 |
| 133 | Times New Roman,12 | 1 | 2 | black | 2 |
| 134 | Tahoma,9.75 | 2 | 1 | black | 2 |
| 135 | Times New Roman,14 | 1 | 2 | black | 2 |
| 136 | Segoe Print bold12 | 2 | 1 | black | 2 |
| 137 | Tahoma,9.75 | 1 | 1 | black | 1 |
| 138 | Tahoma,9.75 | 2 | 1 | GohstWhite | 1 |
| 139 | Time New roman | 1 | 2 | salamon | 1 |
| 140 | Segoe Print bold12 | 2 | 2 | hotpink | 1 |
| 141 | Consolas,10 | 1 | 2 | light blue | 2 |
| 142 | Wingdings | 2 | 2 | slatblue | 2 |
| 143 | Microsoft Sans Serif 18 | 1 | 1 | yellow green | 2 |
| 144 | Times New Roman,12 | 2 | 2 | coral | 2 |
| 146 | Wingdings,12 | 1 | 1 | Pink | 1 |
| 147 | Microsoft Sans Serif 16 | 1 | 1 | Color [Navy] | 2 |
| 148 | Microsoft Sans Serif 12 | 1 | 2 | Peach puff | 2 |
| 149 | Microsoft Sans Serif 12 | 1 | 2 | silver | 2 |
| 150 | Wingdings,12 | 1 | 2 | sea green | 2 |
| 151 | Wingdings,12 | 1 | 2 | apple green | 2 |
| 152 | Tahoma,9.75 | 1 | 1 | slateblue | 2 |
| 153 | Tahoma,9.75 | 3 | 2 | sandybrown | 2 |
| 154 | Time New roman | 1 | 1 | sandybrown | 2 |
| 155 | Segoe Print bold12 | 1 | 2 | GohstWhite | 2 |

| | | | | | |
|-----|-------------------------|---|---|--------------|---|
| 164 | Consolas,10 | 1 | 1 | light blue | 2 |
| | Wingdings | 2 | 2 | sandybrown | 2 |
| 165 | Microsoft Sans Serif 18 | 3 | 1 | salamon | 2 |
| 168 | Times New Roman,12 | 1 | 1 | hotpink | 2 |
| 169 | Consolas,10 | 2 | 1 | GohstWhite | 2 |
| 170 | Consolas,11 | 2 | 2 | coral | 2 |
| 171 | Arial Black,12 | 3 | 2 | yellow green | 2 |
| 172 | Consolas,13 | 1 | 2 | brown | 2 |
| 173 | thoma,12 | 2 | 1 | black | 2 |
| 174 | thoma,13 | 3 | 2 | sea shell | 2 |
| 176 | thoma,14 | 1 | 1 | black | 2 |
| 177 | Arial,12 | 3 | 2 | GohstWhite | 2 |
| 180 | Microsoft Sans Serif 12 | 3 | 1 | slateblue | 2 |
| 181 | Microsoft Sans Serif 12 | 1 | 2 | sandybrown | 2 |
| 182 | Microsoft Sans Serif 12 | 3 | 1 | sandybrown | 2 |
| 183 | Time New roman,10 | 1 | 2 | GohstWhite | 2 |
| 184 | Segoe Print bold12 | 3 | 1 | light blue | 2 |
| 185 | Consolas,10 | 2 | 2 | sandybrown | 2 |
| 186 | Wingdings,12 | 3 | 1 | salamon | 1 |
| 187 | Tahoma,9.75 | 1 | 2 | hotpink | 2 |
| 188 | Tahoma,9.75 | 3 | 1 | GohstWhite | 2 |
| 189 | Time New roman,12 | 2 | 2 | sandybrown | 2 |
| 190 | Segoe Print bold12 | 1 | 1 | teal | 2 |
| 191 | Consolas,10 | 3 | 2 | black | 2 |
| 192 | Wingdings,13 | 1 | 1 | blue | 2 |
| 193 | | | | | |

| User number | menu | lef to right | dirrection | Icon size | Font | Fore color |
|-------------|------|--------------|------------|-----------|--------------------------------|-------------|
| 41 | | 2 | 1 | 2 | Microsoft Sans Serif regular12 | deafult |
| 42 | | 2 | 2 | 3 | Tahoma,9.75 | deafult |
| 43 | | 2 | 1 | 3 | Tahoma,9.75 | deafult |
| 47 | | 2 | 1 | 3 | Microsoft Sans Serif regular12 | deafult |
| 66 | | 1 | 3 | 2 | Tahoma,9.75 | deafult |
| 70 | | 2 | 3 | 1 | corbol,14 | light coral |
| 73 | | 2 | 1 | 3 | Microsoft Sans Serif regular12 | GohstWhite |
| 74 | | 2 | 1 | 2 | Arial,12 | deafult |
| 75 | | 2 | 1 | 2 | Arial,12 | deafult |
| 76 | | 2 | 1 | 2 | Batang,12 | yellow |
| 77 | | 2 | 1 | 2 | Vreinda,12 | deafult |
| 79 | | 2 | 1 | 2 | Andlus,18 | deafult |
| 80 | | 2 | 2 | 3 | verenda,12 | deafult |
| 83 | | 2 | 2 | 3 | Arial,12 | brown |

| | | | | | |
|-----|---|---|---|-----------------------------------|------------|
| 86 | 2 | 1 | 3 | andlus16 | deafult |
| 89 | 2 | 1 | 3 | verenda ,12 | GohstWhite |
| 90 | 2 | 1 | 3 | Tahoma,9.75 | deafult |
| 91 | 2 | 1 | 3 | Cambria,16 | deafult |
| 92 | 2 | 1 | 3 | Tahoma,14 | GohstWhite |
| 93 | 1 | 1 | 1 | Time New Roman,8 | deafult |
| 96 | 2 | 1 | 1 | calibri,14 | deafult |
| 99 | 2 | 1 | 1 | Calibri,18 | deafult |
| 102 | 2 | 1 | 1 | Microsoft Sans Serif regular12 | deafult |
| 103 | 2 | 2 | 2 | Tahoma,9.75 | deafult |
| 104 | 2 | 3 | 2 | corbol,14 | deafult |
| 105 | 1 | 2 | 3 | Microsoft Sans Serif regular12 | deafult |
| 106 | 2 | 2 | 2 | Arial ,12 | GohstWhite |
| 107 | 1 | 2 | 3 | Cambria,12 | deafult |
| 108 | 1 | 1 | 2 | Arial narrow,12 | deafult |
| 109 | 1 | 1 | 3 | andlus,16 | deafult |
| 110 | 2 | 1 | 1 | Tahoma,9.75 | deafult |
| 111 | 2 | 1 | 2 | Batang,12 | deafult |
| 112 | 2 | 3 | 1 | Vreinda,12 | deafult |
| 115 | 1 | 3 | 3 | Andlus,18 | deafult |
| 116 | 1 | 3 | 1 | verenda ,12 | deafult |
| 117 | 2 | 2 | 3 | Arial,12 | deafult |
| 118 | 2 | 1 | 2 | Book Antiqua,12 | deafult |
| 120 | 2 | 3 | 1 | Microsoft Sans Serif regular12 | deafult |
| 121 | 2 | 2 | 3 | Tahoma,9.75 | deafult |
| 122 | 2 | 2 | 3 | corbol,14 | deafult |
| 124 | 1 | 3 | 1 | Microsoft Sans Serif regular12 | deafult |
| 125 | 1 | 1 | 1 | Tahoma,9.75 | deafult |
| 126 | 1 | 1 | 1 | Cambria,12 | deafult |
| 128 | 1 | 1 | 2 | Arial 12 | deafult |
| 129 | 2 | 1 | 2 | corbol,14 | deafult |
| 130 | 2 | 1 | 2 | Microsoft Sans Serif regular12 | deafult |
| 131 | 2 | 1 | 3 | Arial ,12 | Violet |
| 132 | 1 | 1 | 1 | Cambria,12 | deafult |
| 133 | 2 | 2 | 1 | Book Antiqua,12 | deafult |
| 134 | 2 | 2 | 2 | corbol,14 | deafult |
| 135 | 2 | 2 | 2 | Microsoft Sans Serif regular12 | deafult |
| 136 | 2 | 3 | 3 | Arial ,12 | deafult |
| 137 | 2 | 3 | 1 | corbol,14 | deafult |
| 138 | 2 | 3 | 2 | Microsoft Sans Serif regular12 | deafult |
| 139 | 2 | 2 | 1 | Arial ,12 | GohstWhite |
| 140 | 2 | 1 | 3 | Cambria,10 | deafult |

| | | | | | |
|-----|---|---|---|-------------------------|------------|
| 141 | 2 | 3 | 2 | Book Antiqua,12 | deafult |
| 142 | 2 | 3 | 3 | Vreinda,12 | deafult |
| 143 | 2 | 3 | 1 | Andlus,18 | deafult |
| 144 | 2 | 1 | 3 | verenda ,12 | deafult |
| 146 | 2 | 2 | 1 | Arial,12 | deafult |
| 147 | 2 | 3 | 2 | Aparajita,16 | deafult |
| 148 | 1 | 2 | 2 | Tahoma,9.75 | deafult |
| 149 | 2 | 1 | 3 | Vreinda,12 | deafult |
| 150 | 1 | 2 | 2 | Andlus,18 | DarkKhaki |
| 152 | 2 | 3 | 3 | verenda ,12 | deafult |
| 153 | 1 | 1 | 1 | Arial,12 | deafult |
| 154 | 1 | 3 | 3 | andlus16 | deafult |
| 160 | 1 | 1 | 3 | verenda ,12 | deafult |
| 162 | 2 | 2 | 3 | Tahoma,9.75 | deafult |
| 163 | 2 | 3 | 1 | Cambria,16 | deafult |
| 164 | 1 | 1 | 2 | Tahoma,14 | deafult |
| 165 | 2 | 3 | 2 | Time New Roman,8 | deafult |
| 168 | 2 | 1 | 2 | calibri,14 | |
| 169 | 2 | 3 | 2 | Dotum,14 | green |
| | | | | Microsoft Sans Serif | |
| 170 | 2 | 1 | 3 | regular12 | deafult |
| 171 | 2 | 3 | 3 | Tahoma,9.75 | DarkKhaki |
| 172 | 2 | 1 | 3 | corbol,14 | deafult |
| | | | | Microsoft Sans Serif | |
| 173 | 2 | 3 | 3 | regular12 | deafult |
| 174 | 2 | 1 | 1 | Time New roman | deafult |
| 176 | 2 | 3 | 1 | Segoe Print bold12 | deafult |
| 177 | 2 | 1 | 1 | Consolas,10 | GohstWhite |
| 180 | 2 | 3 | 1 | Wingdings | deafult |
| 181 | 2 | 1 | 2 | Microsoft Sans Serif 18 | deafult |
| 182 | 2 | 2 | 2 | Time New roman,12 | deafult |
| 183 | 2 | 3 | 2 | Tahoma,9.75 | dark blue |
| 184 | 2 | 2 | 1 | Book Antiqua,12 | red |
| 185 | 2 | 3 | 2 | corbol,14 | deafult |
| | | | | Microsoft Sans Serif | |
| 186 | 2 | 2 | 2 | regular12 | deafult |
| 187 | 2 | 3 | 3 | Arial ,12 | Violet |
| 188 | 2 | 3 | 3 | corbol,14 | deafult |
| | | | | Microsoft Sans Serif | |
| 189 | 2 | 3 | 3 | regular12 | deafult |
| 190 | 2 | 3 | 2 | Arial ,12 | green |
| 191 | 2 | 3 | 1 | Cambria,10 | yellow |
| 192 | 2 | 3 | 3 | Book Antiqua,12 | deafult |
| 193 | 2 | 3 | 3 | Tahoma,9.75 | deafult |

| User number | text box left to right | font | text color | border style |
|-------------|---------------------------|--------------------------------|--------------|--------------|
| 41 | 1 | thoma 14 | black | 1 |
| 42 | 2 | Consolas,10 | black | 1 |
| 43 | 2 | thoma 14 | white | 2 |
| 47 | 2 | Arial ,12 | Tan | 3 |
| 66 | 2 | Estrangelo Edessa,10 | Tomato | 3 |
| 70 | 2 | Candara,12 | black | 3 |
| 73 | 2 | Arial Black,18 | gray | 1 |
| 74 | 2 | Microsoft Sans Serif 16 | light gray | 2 |
| 75 | 2 | andlus ,12 | black | 3 |
| 76 | 2 | Consolas,10 | green | 1 |
| 77 | 2 | Segoe Print bold14 | slatblue | 2 |
| 79 | 2 | Time New roman,20 | yellow green | 2 |
| 80 | 2 | Arial ,12 | coral | 3 |
| 83 | 2 | andlus ,18 | Pink | 3 |
| 86 | 1 | Dotum,8 | Navy | 1 |
| 89 | 2 | Arial Black,18 | Peach puff | 1 |
| 90 | 2 | Microsoft Sans Serif 16 | silver | 2 |
| 91 | 2 | Arial Black,12 | sea green | 3 |
| 92 | 2 | Microsoft Sans Serif 16 | apple green | 3 |
| 93 | 1 | Arial Black,18 | slateblue | 1 |
| 96 | 2 | Microsoft Sans Serif 16 | sandybrown | 2 |
| 99 | 2 | Arial ,12 | sandybrown | 2 |
| 102 | 2 | corbol,14 | GohstWhite | 3 |
| 103 | 1 | Arabic Typesetting | light blue | 3 |
| 104 | 1 | Arial ,12 | GohstWhite | 3 |
| 105 | 1 | Cambria,10 | light blue | 1 |
| 106 | 2 | andlus ,12 | sandybrown | 1 |
| 107 | 2 | Microsoft Sans Serif 16 | salamon | 2 |
| 108 | 1 | Arial ,12 | hotpink | 2 |
| 109 | 1 | corbol,14 | GohstWhite | 1 |
| 110 | 1 | Microsoft Sans Serif regular12 | sandybrown | 3 |
| 111 | 1 | Arial ,12 | teal | 1 |
| 112 | 1 | andlus ,18 | black | 2 |
| 115 | 2 | Dotum,8 | blue | 3 |
| 116 | 2 | Arial Black,18 | silver | 1 |
| 117 | 2 | Microsoft Sans Serif 16 | gray | 3 |
| 118 | 2 | Arial ,12 | wheate | 2 |
| 120 | 2 | corbol,14 | Tomato | 1 |
| 121 | 2 | Microsoft Sans Serif regular12 | light gray | 3 |
| 122 | 2 | Arial ,12 | Orchid | 2 |
| 124 | 2 | Cambria,10 | LightGrey | 3 |
| 125 | 2 | andlus ,12 | Orchid | 1 |
| 126 | 2 | Segoe Print bold12 | red | 2 |

| | | | | |
|-----|---|--------------------------------|--------------|---|
| 128 | 2 | Andlus,12 | Violet | 3 |
| 129 | 2 | Arabic Typesetting,12 | GohstWhite | 3 |
| 130 | 2 | Candara,16 | light blue | 3 |
| 131 | 2 | Microsoft Sans Serif 16 | sandybrown | 3 |
| 132 | 2 | Tahoma,9.75 | salamon | 3 |
| 133 | 2 | Arial ,12 | hotpink | 3 |
| 134 | 2 | Microsoft Sans Serif 16 | GohstWhite | 1 |
| 135 | 1 | Segoe Print bold12 | sandybrown | 1 |
| 136 | 2 | Consolas,10 | Lighty grey | 1 |
| 137 | 2 | Wingdings | Violet | 3 |
| 138 | 2 | Microsoft Sans Serif 18 | sandybrown | 1 |
| 139 | 2 | Times New Roman,12 | light blue | 2 |
| 140 | 2 | Tahoma,9.75 | black | 1 |
| 141 | 1 | Book Antiqua,12 | light blue | 1 |
| 142 | 2 | corbol,14 | peru | 2 |
| 143 | 2 | Microsoft Sans Serif regular12 | Morton | 3 |
| 144 | 2 | Arial ,12 | plum | 1 |
| 146 | 1 | corbol,14 | rosy brown | 2 |
| 147 | 2 | Microsoft Sans Serif regular12 | black | 1 |
| 148 | 2 | Arial ,12 | light blue | 1 |
| 149 | 2 | Cambria,10 | light blue | 1 |
| 150 | 2 | Book Antiqua,12 | yellow green | 1 |
| 152 | 1 | Dotum,8 | sandybrown | 1 |
| 153 | 2 | Microsoft Sans Serif 16 | light blue | 1 |
| 154 | 2 | Microsoft Sans Serif 16 | black | 2 |
| 160 | 2 | Arial ,12 | light blue | 2 |
| 162 | 2 | corbol,14 | peru | 2 |
| 163 | 1 | Microsoft Sans Serif regular12 | Morton | 2 |
| 164 | 2 | Arial ,12 | plum | 3 |
| 165 | 2 | Cambria,10 | black | 1 |
| 168 | 1 | andlus ,12 | light blue | 2 |
| 169 | 2 | Time New Romans ,12 | peru | 3 |
| 170 | 2 | Segoe Print bold16 | Morton | 1 |
| 171 | 2 | Book Antiqua,12 | plum | 2 |
| 172 | 2 | Arial black ,12 | hotPink | 2 |
| 173 | 2 | Segoe Print bold12 | yellow green | 2 |
| 174 | 2 | Time new roman,16 | black | 3 |
| 176 | 1 | Arial black ,18 | LightGrey | 1 |
| 177 | 2 | Candara,12 | Orchid | 2 |
| 180 | 2 | Malgun Gothic,12 | Orchid | 2 |
| 181 | 2 | Microsoft Sans Serif regular12 | Violet | 1 |
| 182 | 2 | Cambria,10 | Violet | 3 |
| 183 | 2 | Book Antiqua,12 | Orchid | 1 |
| 184 | 2 | Dotum,8 | silver | 2 |
| 185 | 1 | Book Antiqua,12 | teal | 3 |
| 186 | 2 | Cambria,10 | brown | 1 |

| | | | | |
|-----|---|--------------------------------|--------------|---|
| 187 | 2 | Book Antiqua,12 | green | 2 |
| 188 | 2 | Malgun Gothic,20 | Violet | 3 |
| 189 | 1 | Microsoft Sans Serif regular12 | yellow green | 1 |
| 190 | 1 | Microsoft Sans Serif 14 | teal | 1 |
| 191 | 1 | Cambria,10 | black | 1 |
| 192 | 2 | Dotum,14 | LightGrey | 2 |
| 193 | 2 | Candara,12 | teal | 2 |

Data Dictionary

Appendix D

Data Dictionary

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Adorable: The free dictionary defines Adorable as a very attractive, lovable or having characteristics that attract love or affection

Attitudes: the sum of beliefs about a particular behavior weighted by evaluations of these beliefs

Affect (mood, emotion, feelings) is a fundamental aspect of human beings and is found to influence reflex, perception, cognition, and behavior

Affective quality: is the ability of an object or stimulus to cause changes in one's affect. Limited empirical data in Human-Computer Interaction research suggest that perceived affective or hedonic quality of an interface has a positive impact on users

Affective impression: is the user appraisal of the affective qualities of the HCI

Beauty is measure form color, consistency, style, culture for the user and designer.

Behavioral intention: "a function of both attitudes toward a behavior and subjective norms toward that behavior, which has been found to predict actual behavior"

Color saturation: purity or strength of color, due to the absence of black, white or gray

Core affect: is a neurophysiologic state that is consciously accessible as a simple, non-reflective feeling

Subjective norms: look at the influence of people in one's social environment on his/her behavioral intentions; the beliefs of people, weighted by the importance one attributes to each of their opinions, will influence one's behavioral intention."

Perceived ease-of-use: the degree to which a person believes that using a particular system would be free from effort

Perceived usefulness. This was defined by Fred Davis as "the degree to which a person believes that using a particular system would enhance his or her job performance"

Graphical user interface: a user interface based on graphics (icons, pictures and menus) instead of text only; uses a mouse as well as a keyboard as an input.

Density: optimize the occupied areas of the screen as leaving about a half of the screen area as a white space is pleasing to the eye

Design Factors : all of the elements within the limits of the user interface, the primary design factors identified included texture, shape and color

Diverse media : mean mixed media such as sound, text, animation and video

Interactivity: It is similar to the degree of responsiveness, and is examined as a communication process in which each message is related to the previous messages exchanged, and to the relation of those messages to the messages preceding them

learn ability: the ease with which new user can begin effective interaction and achieve maximum performance

Letter Case : Agronomists have consistently recommended using mixed case letters and shy away from using all uppercase letters, especially for continuous text

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

Vividness: It's the richness of representation in the human computer interface