Exploring Dynamic User–Interface in Achieving Software Application Viability

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Abstract

Software applications are explored for any desired operation through their various interfaces. User-interface is a term synonymous with computer ergonomics which is concerned with the human-computer interface. Dynamic user-interface ensures an evolving technology that harmonizes and aligns the links in an application for effective functionality. It is perhaps the most visible and hence most important segment of a software application as it presents the entire system at a glance. The ultimate goal of system developers centers on striking a balance between the cost of time related to developing a user-friendly interface and the cost of handling user errors. Deploying appropriate technical skills in design is critical to software viability – giving rise to user swift choice of application. This paper presents a scenario mindful of the user, as usability of an application is essentially interface-driven. Indeed, appropriately utilizing the rudiments of user interface in application development may be a diffults task and time consuming, but there lies the secret of its viability.

KEYWORDS: User-interface, ergonomics, response time, prototype, modality.

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1.0 Introduction
Research Background

The user interface is one of the most important parts of any application program because it determines how easily you can make the program to perform a given operation. A powerful program with a poorly designed user interface has little value[1].

A user-interface therefore, is a means of interaction between an application or machine and the user. The interface provides a means of allowing the users to manipulate a system (input) and allowing the system to indicate the effects of the users' manipulation (output). Examples of this broad concept of user interfaces include the interactive aspects of computer operating systems, hand tools, operator controls, and process controls.

Generally, user-interface is a concept often used in the context of computer system and electronic devices. It includes hardware (physical) and software (logical) components. With the increased use of personal computers, the term user interface is generally assumed to mean the *graphical user interface* (GUI).

Software applications development processes is tasked with decisions regarding

the interface picture. Why is it so, one may ask? Aa user is first attracted to an application by the interface appearance and ability to influence their performance expectations. Moreover, user interfaces are considered by some authors to be a prime ingredient of computer user satisfaction [2]. User-friendly interfaces are self-instructing with adequate provision for assistance and response to errors.

Types of User Interface

UI is a visual interactive platform for utilizing the resources in a system. There are essentially three main types of user interfaces in respect to computing technology:

(1) *Command language*: the user must know the machine and program-specific instructions or codes.

(2) *Menus*: user selects command choices from various lists or menus displayed on the screen. Such interface is described as menu-driven.

(3) *Graphical user interface (GUI)*: user gives commands by selecting and clicking on icons displayed on the screen. Different pictures or a symbol relating to an operation is used to designate it on the screen. Graphical user interfaces (GUIs) that use windows, icons, and pop-up/pull down menus have become standard on personal computers.

Creating A User-Interface

A close reflection on the best-selling window based applications from Microsoft or other companies can make a good start. You will perhaps find many features in common; such as toolbars, status bars, tabbed dialogs etc. The user-interface diagram of figure1 below is the control center for an application that automated the operation of a micro-finance organization. Obviously, it used both menus and symbols to showcase an attractive and interactive entry point.
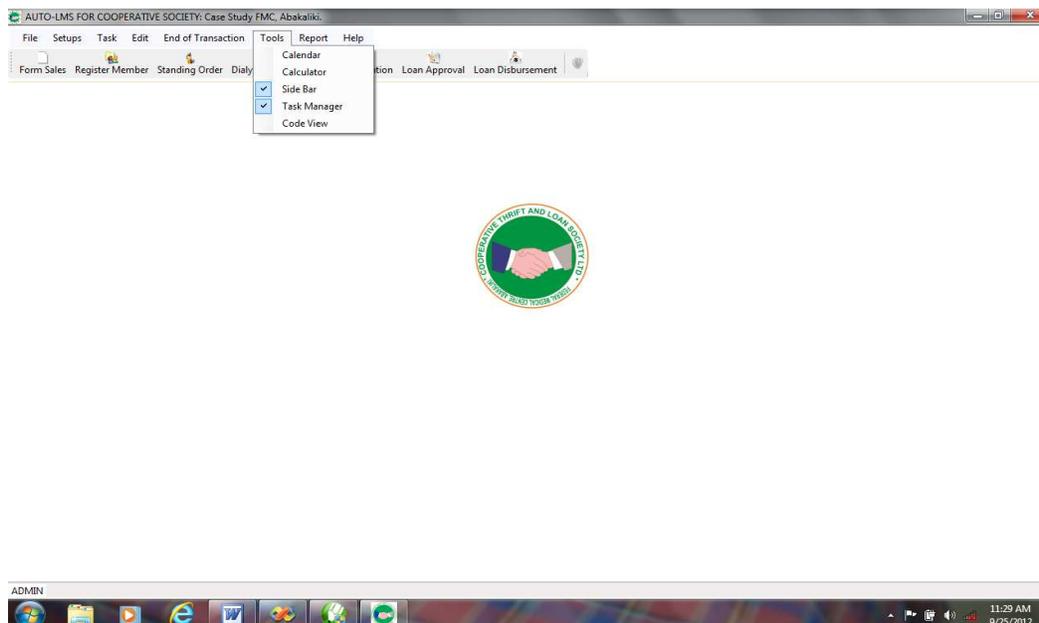

Fig.**1:Typical Interactive Interface**

Apparently, the act of designing a user interface is better approached as an iterative process, as one will rarely come up with a perfect interface appearance on just one touch[3]. It rather involves the development of prototype interfaces. It is pertinent to remark that design of a user interface affects the amount of effort the user must expend to provide input for the system and to interpret the output of the system, and how much effort it takes to learn how to do this [4].

Therefore, before you begin to design the user-interface for your system, make a clear and purposeful thought about the need for the application. In doing this, you will first spell out issues on whether to use single-document or multiple-document style. Plan and decide the number of forms to be used, the type of commands that will feature in your menu and whether toolbars can be used to duplicate menu functions.

Also, consider if dialog windows can be used to interact with the user and further resolve how best the system will provide assistance to users. More importantly, the target audience should play key influence in your choice of design technicalities. Always introduce a more simpler or easy to understand tools for beginners and probably complex ones for experienced users.

User-focused Interface

User-centered design is an approach where the needs of the user are paramount and where the user is involved in the design process. The effectiveness of any software depends partly on how it relates with the user and partly on how robust it carries out all computations accurately [5]. Similarly, the value and viability of any user interface is certainly been determined by the judging of others. So, the user interface of an application should impact greatly on the opinion of the user. No matter how well optimized and brilliant the code driving an application may be; if the users find it difficult to use, it certainly cannot sale [6].

Furthermore, users view your application as a means to an end; a way to accomplish a task more easily than they would without the computer aid. A well packaged user interface insulates the user from the underlying technology; it is least of their concern but to perform an intended task with relative ease. Therefore, in designing the user interface for an application that must be the users delight, first keep the user in mind by answering these questions:

• Can users easily identify the features without instruction?
• How quickly will the application respond to occurrence of user errors?
• What help tips or user assistance must be in place?
• Is the design aesthetically appealing or attractive to the users?

Sincere solution to the above and other related issues bordering on user-focused design will produce a viable application of global acceptance.

Principles of User-Interface Design

The robustness of an application begins with the interface. User experience/ expectations vary but tend to revolve within these factors:

1. *Simplicity*: is a function of clarity and concise presentation of the facts and functions. Keep things clear but concise so that people can figure out how your application works or where to go for a particular operation. As much as possible, minimize the use of word/figures and sentences in labeling items or explaining features respectively. Instead, introduce the likes of reflective symbols with hover over buttons that depict the operation in focus – It saves valuable time of users and brings great rewards after all.
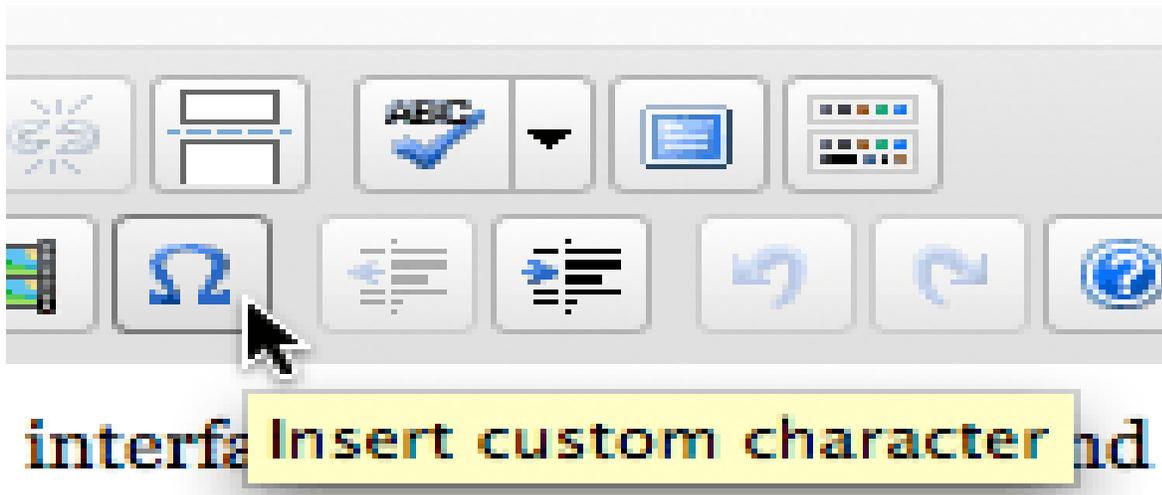
Fig.2: Hover over buttons

The "hover over" buttons above in WordPress and a tooltip pops up explaining their functions.

2. *Colour Combination Consideration (C³):* the use of varieties of colours in interface design gives visual appeal to users, but must be with caution. Preference for colours varies widely among different users. Hence, it is rather advised that you conserve colours, only using soft and more neutral colours.

3. *Use of Images and Icons:* Careful use of images and icons are very essential to attracting visual interest of users. Images often convey information compactly even without text, though they are usually perceived differently by different people. Familiar images whose functions can easily be identified will preferably work better. In designing toolbar icons, take a look at successful applications to observe what standards are already established. This way, your interface would not appear below standard.

4. *Use of Intuitive Features:* Keep user options intuitive i.e. introducing familiar features with more natural instincts. This keeps the flow of the experience smooth and again the user doesn't have to think too hard. Simply identify how your application should 'work' – what functions does it need to work? Figure out what exactly the user is trying to achieve, place those features that let them do exactly that without any fuss.

5. *Choice of Fonts:* It is primarily important to ensure easily readable fonts at different resolutions and on different types of displays.

Vital Characteristics of User Interface

There are a number of considerable features that characterizes user interfaces of software applications which in turn makes the software viably marketable and useful. Lack of these vital ingredients of an application may end it up as the delight of only the developer. Concise discussion each of these characteristics below sheds more light on this dauntless fact.

A. Compatibility

This help to make expected user input and the system response to be consistent with the user's model of the world. For instance, a command statement 'STOP' designated in

red colour would be user-compatible than using green colour. Compatibility factor reduces *information recording* demand on the user. High compatibility can be attained by presenting a user with non-conflicting information and reinforcing standard expectations. It will further match output with the expected user input and present output in a directly usable form. Also, graphic symbols called *icons,* can be used to represent menu selections.

B. Consistency

All aspects of the user interface should be as consistent as possible to avoid pressured articulation on user memory. Consistent look and feel creates harmony in an application – everything seems to fit together [4]. It is a virtue to covet and one quality to trade off in user interface design. An interface lacking consistency can result confusion and doubt of reliability in the mind of potential user.
A consistent UI uses appropriate controls suitable for the application throughout and ensures uniform property settings for all. A user looking for a command should have a consistent search strategy for finding it. Commonly related dimensional and background effects of *forms* accounts for ease of usability.

C. Affordances

This refers to visual clues to the function of an object. It expresses obvious on the controls its task and give clear explanation to intending user (user-friendly) of the tools. The user interface makes good use of affordances to simplify the tasks before operators in diverse manner. For instance, the three-dimensional effects used on command buttons as shown in figure 3 below makes them look like they are meant to be pushed. Hence, push buttons, knobs and light switches are all affordances usually explored to maintain interface friendly applications. Merely looking at them you can discern their purpose.
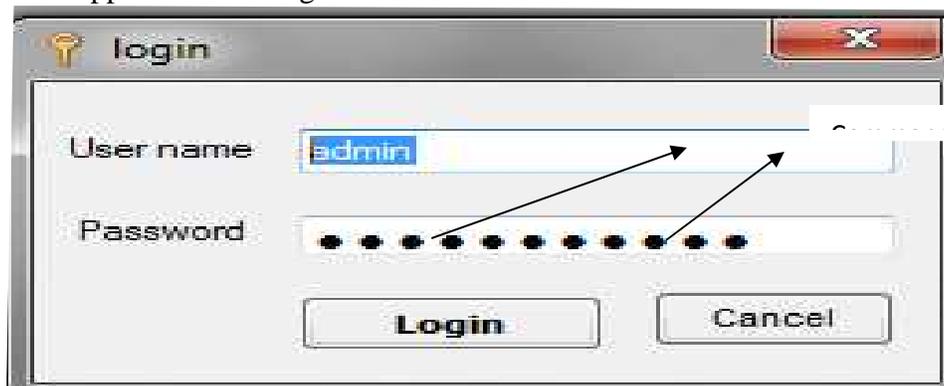
Fig.3: Window Interface with Command Buttons

D. Flexibility

A viable application can adapt to the skill level of the user. This are commonly observed in cases of naïve users, they generally tend to be most comfortable with menu-driven systems. While a menu driven system may be considered slow in operation, a good/viable system most certainly provides for smooth transition from one type of dialogue to another.

From your own experience as a software user, you will appreciate that most viable applications provides choices to accommodate varying user preferences. Providing options will broaden the appeal of your product to the target audience.

E. Usability

This is the degree to which the design of a particular user interface takes into account

the human psychology and physiology of the users, and makes the process of using the system effective, efficient and satisfying.

Usability is mainly a characteristic of the user interface, but is also associated with the functionalities of the product and the process to design it. It describes how well a product can be used for its intended purpose by its target users with efficiency, effectiveness, and satisfaction, also taking into account the requirements from its context of use.

F. Attractive

This entails fashioning the look and feel of your interface for your audience delight. Also, moderated use of aesthetics reinforces the functions and further creates a platform that advances users with potentials to perform those functions faster with less effort. It gives a sense of true satisfaction to users.

G. Response Time

It is important to remark that computer is expected to respond immediately to any user input and thus acknowledge the user's action within seconds. Furthermore, status "updates" of the action being sort are expected in less than six seconds. A good interface ensures that progress report on any ongoing task carry the user along. So, application up time accounts for system-user interactivity thereby enhancing its viability.

Discussions

The user interface of an application or a device explains the look and feel of the on-screen menu system [7]. How it works, its color scheme, how it responds to button presses, all of these things are part of the user interface. There are two words commonly used in UI design to describe the different ways in which a user can utilize a product.

First, is *Modality:* it refers to several alternate interfaces to the same product, and the other is called *Mode:* which describes different states of the same interface. Both terms centers on user-system interaction with integrated coherent framework for proper information manipulation.

A modality is a path of communication employed by the user interface to carry input and output. Examples of modalities:
- Input – computer keyboard allows the user to enter typed text, digitizing tablet allows the user to create free-form drawing.
- Output – computer monitor allows the system to display text and graphics (*vision modality*), loudspeaker allows the system to produce sound (*auditory modality*).

The user interface may employ several redundant input modalities and output modalities, allowing the user to choose which ones to use for interaction.

On the other hand, the mode is a distinct method of operation within a computer program, in which the same input can produce different perceived results depending of the state of the computer program. For example, caps lock sets an input mode in which typed letters are uppercase by default; the same typing produces lowercase letters when not in caps lock mode.

However, heavy use of modes often reduces the usability of a user interface, as the user must expend effort to remember current mode states, and switch between mode states as necessary.

Conclusion

Dynamic user interface is a vital tool required in software application development to attract wide patronage. It is therefore an inevitable end to satisfying the user without overrunning or placing much demand on his thoughts.

Hence, a critical thought on what informs the user experience must be the bane for every interface design**.** Since achieving a perfect balance takes skill and time, and each solution will depend on a case by case basis. Indeed, appropriately utilizing the rudiments of user interface in application development may be a herculean task and time consuming, but there lies the secret of its viability.

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