A Study on User Experience

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Abstract - *Personal computing and information technology advancements have fundamentally changed how maps are produced and consumed, with many maps now being highly interactive and delivered online or via mobile devices. As a result, interaction needs to be viewed as a key addition to illustration in cartographic and visualization purposes. The terms "user interface" and "user experience" refer to a set of ideas, prescriptions, and procedures for considering critically the creation and use of interactive products. There are several ways available to effectively convey material to people. The emphasis moves to user comfort as a result of the flexibility and diversity of the information that may be supplied via web apps. Therefore, for such apps, a user experience design geared at user delight becomes the primary focus.*

***Key Words*: User Experience, Web Application, Human Computer Interaction, UX Framework, Websites.**

1. INTRODUCTION

User experience (UX) is considered to be a multidimensional concept, and a generally accepted definition is still missing. It is a curious phenomenon, accepted by human computer interaction (HCI) society – both professionals and scholars and also criticized multiple times for being ambiguous, obscure, ephemeral [1]. In terms of design as well as user interaction, web apps and websites are very different. Websites provide static material, but by utilizing a content management system, they may routinely alter that content to meet the demands of the company.

Desktop apps are currently being transitioned or modified to web applications for convenience of use, and the fact that they are distributed via browser makes them an effective alternative for optimizing the functionality to numerous devices. Using the web technologies to host its applications, an IT department may drastically minimize the amount of desk-side support required and remove performance monitoring of individual components of user hardware and software. A consolidated support and administration system makes it easy to transfer from one platform to another and to update seamlessly without causing significant interruption to users, therefore saving the organization money. In such circumstances, the edition checks and security may be simply centralized.

Firms are focusing primarily on the user experience (UX) as more items are automated and machine learning is integrated into apps. Businesses invest their assets in UX research ahead of branding their product, which then becomes a customer experience framework [2], to guarantee that the least number of resources are used for assistance. As more and more apps are built using thin-client architecture, where business logic resides on the client devices, and as the number of mobile use minutes has risen over time, attention is being paid to front end technologies. The latest figures show an increasing number of smartphone users year after year. In 2022, the number of global smartphone users is estimated at 6.6 billion, marking a 4.9 percent annual increase [3].

Thus, user experience design that takes into account different devices, screen resolutions, voice search and touch features in addition to handling mouse movement, keyboard strokes, etc are required. Numerous smart devices are used to access application content, making it responsive. Recently, UX designers are now experimenting with more physical interactions and are not simply confined to building user experiences for screens [4]. Concepts of Augmented reality, Virtual reality and Mixed reality are being incorporated into applications – few of them being Snapchat and PokemonGo.

2. RELATED WORKS

Similar research has been done in the past in this field. Some earlier studies have performed retrospective analysis on UX methods, designs and techniques while also working on the different factors that affect in the popularity of any application. These factors can include user perception, security, emotional and psychological affect that popularity of any website.

In a study conducted by Dr.Jay Kiruthika et al., [2] the authors look into few issues of designing web applications and recommends design criteria to create efficient web applications. Web based interfaces/applications focus on retaining the users and engage them [5]. It was found that the customer experience of CX is a parallel framework that intercedes with UX in huge retail businesses as extensive feedback is fed into the system.

N. H. Basri et al., in their paper [6] review and explore various existing approaches to conceptualize and understand user experience better. It is trying to provide a base in conceptualizing and understanding user experience by covering different topics related to user experience. There is no consensus on how UX should be defined and researched [7]. UX is obviously not restricted to work systems, as it

concerns many subjective aspects beyond performance [8]. It was be concluded that the concept of UX is wide due to a holistic experience and to the business point of view. UX encompasses all aspects of interacting with a product. UX objectives are to optimize human performance and user satisfaction with achieving both pragmatic and hedonic goals.

In his research Craig E. Wills [9], discusses approaches using GUIs and other techniques for effective user interface design and how they might be incorporated into an engineer's training. This paper discusses approaches for incorporating techniques for interface design into an engineer's training, whether through a regular course or a seminar. It was understood that the engineer must understand that the interface is much more than the devices with which the user interacts with the system. Also important is the dialogue, the style of interaction between the user and the machine.

Another research was conducted by Ferenc Erdős in 2019 to highlight and analyse the monetary sides of different business software developments related to UX [10]. To capture the business value of UX, the Cost-Benefit Analysis (CBA) was applied. Various methods are available for quantifying the user satisfaction criterion [11 & 12]. The measurement can take place on different levels, with different methods and granularity. The sophisticated user-centred design and development methods can raise the initial design and development costs of a software system. Furthermore, the anticipated benefits can deliver many different positive financial effects.

You-Dong Yun et al., in their work [13] proposed a cognitive reaction-based intelligent UI/UX system that provides UI/UX optimized for senior citizens [14] based on the user's cognitive functionality and activity log. Features that are relevant to the user's usability affect UI/UX and can be adapted to the user's model [15]. A variety of methods are being used to measure the different sensory and cognitive functions. The cognitive reaction-based intelligent UI/UX system proposed in this work automatically clusters seniors based on collected cognitive functionality data and optimizes UI/UX components based on the user's cluster.

3. METHODOLOGY IN UX

This section gives a brief overview of the different designs and methodologies that can be adopted while working on any web applications or websites. The different designs and their use cases has been explained.

Instead of focusing just on user interaction, UX design bases itself on the emotional experience of a user. In order to prevent users, it uses human-computer interaction and persuasive triggers. Since its founding, HCI research has been almost entirely focused on the accomplishment of behavioral goals in work contexts.

3.1 Skeuomorphic Design

Skeuomorphism is a method used in UI design where objects, icons, and buttons imitate their real-world equivalents. It is described in the context of product design. It makes scaling a design challenging because it isn't responsive. It makes extensive use of simply ornamental components, which are more difficult to adjust to different screen sizes and resolutions and thus, is resource intensive [16].

3.2 Flat Design

It is centered on minimalism and is tuned to improve the UX, operates within the constraints of the screen [2]. Any aesthetic elements that attempt to mimic the real world are removed. A flat design gives the impression that everything is flat on one surface. As the name implies, this design utilizes features such as minimalism, 2D elements, bold colours, and simple typography. The transition to flat design reflects design development rather than upheaval. There was simply no need to include extraneous visual components that mirror real-world aspects as consumers grew used to digital patterns and interactions [16]. It was incorporated to improve human computer interaction (HCI).

3.3 Material Design

Material Design, introduced by Google, focuses mostly on flat objects with a few 3D touches. Designers may construct several layers by experimenting with the Z-axis thanks to the 3D elements, which enable them to create a multi-dimensional experience [16]. Physics is also introduced in Material Design. Making exact replicas of how objects operate in the actual world while doing it in a radically simplified fashion is one of the primary tenets of Material Design. Realisticism is solely used in Material Design as a technique to help our minds become more used to how the interface functions.

3.4 Hamburger Menu

One of the aspects employed in UX designs is the usage of hidden menus that the user may expand. Instead than overloading the user with vast material for quick and faster access, the usage of such menus enables the user to pick several alternatives based on the needs [2].

4. UX MEASUREMENT TECHNIQUES

This section contains information about the different measurement techniques that any organizations need to adopt to open new business and app development policies.

4.1 Emotional Analysis

With the use of emotional analytics technologies, physiological data will assist UX testers in understanding a

user's sentiments as they interact with applications [17]. Experiences that are both emotionally engaging and useful will be the future of user experience design.

Kerry Rodden et al [18], explain the HEART framework for user-centered metrics, and a means for linking metrics to product goals. HEART measures *Happiness, Engagement, Adoption, Retention,* and *Task success*. These are the areas which teams can use to create the exact metrics that will be used to measure progress toward goals. Task Success includes both effectiveness and efficiency, while Happiness includes contentment. Engagement, Adoption, and Retention are enabled by enormous amounts of behavioral data.

4.2 Qualititive Research

It emphasizes the nature or significance of the end-user experience. Utilizing qualitative UX research techniques, a thorough insight of specific users is gathered. They are concerned with comprehending the aspects of the human experience. Notable qualitative research techniques include: focus groups, interviews, diary studies, and card sorting among others. Three main phases are involved in qualitative research: planning the study, performing research, and analyzing the findings.

4.3 Voice Search

The popularity of voice-based systems such as Apple Siri, Amazon Alexa, and Google Voice helps the programmer to surface apps on smart devices. As a result, voice search should be tracked by UX testing tools [18], and UX designers need to enhance for it.

4.4 Ethical Testing

With real-time UX data capturing, omnipresent gadgets, and distributed analytics, ethical and regulatory problems are expected to develop. As a part of the testing process, UX teams should collaborate with digital protection officers and other specialists to solve these problems. Participants involved in the UX research must be treated with dignity and compassion. Respect should be shown towards the stakeholders, the peers, and the funds and confidence shown by them in the work. UX research should adhere to the criteria related to social science and human subjects research, including any studies that employ specified processes for gaining informed consent. If conducted improperly, any study that involves human subjects, might violate ethical standards.

4.5 Utility Function

UX measurement in the past relied on imprecise academic theories. However, in the future, researchers will eventually gauge UX in terms of particular commercial results. Any website containing incredibly good content on it, has higher utility as compared to other websites. Taking example of Wikipedia, it actually aims to become a platform that prioritizes usefulness above all else, and since its utility is so strong, users tend to overlook a few of the other UX aspects where it falls short [19].

5. UX FRAMEWORK

This section provides an overview on a web application's UX framework. The very first step is to design distinct profiles for the application, which includes varied amounts of viewable material for different consumers. The major features on which the UX concentrated were:

- The user should be able to access material in the language of the nation and area in which they are logged in. In other words, the content of the application should be internationalized.

- Restricting asset information to specific nations, cities, regions, and posts.

- Information displayed should be put together by clearly recognizable symbols relevant to the product with which the user is familiar.

- Options for searching with easy autofill or recommendations.

- Maintaining an uniform layout across all of the pages

3. DISCUSSION AND CONCLUSIONS

This research considered a range of aspects that can be used to make a better web application. UX has emerged as a critical component of application design and development, particularly for web-based programs and websites. They are intended to be simple to use and correlate with business cases. A design that is user friendly and simple while having a rich content always gets more users. The content and design should be user centric.

As there is evolution of the application and the websites, there is advancement in the usage of haptic responses like gestures along with biometrics and voice commands. Any application trying to make it to the market should include the features. Incorporating features like Augmented, virtual and mixed reality is becoming more and more popular, for example, the cosmetics website. Thus, while starting with any website the UX research is important.

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