

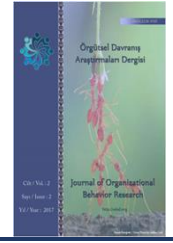


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DESIGNING AN APPLICATION USER INTERFACE

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ABSTRACT

Time is very important in the world of technology. Online education can make dead time usable for us. It is unnecessary to spend a lot of time in traffic to reach an educational center or to give up learning it because of the lack of special education in our city and place of residence. Mobile applications allow us to enjoy learning our favorite subject at any time and in any place. This research examines the design of an application user interface. The research is descriptive and analytical through library resources. At first, it reviewed the design of user interface. It discussed the importance of mobile learning and its definition, the application and its history. Then a variety of user interface design styles and languages were proposed for the application. Various types of applications were examined, including their use, and variety of educational applications. It finished with assessing the user interface and user experience of one of the world's most popular applications.

Keywords: Online education, Application user interface, Educational applications, Mobile software

INTRODUCTION

Various methods through which one can update his/her knowledge and information are added every day with the advancement of technology and the increase in people's interest in acquiring knowledge. Electronic and distance education has found in recent years a special place in many advanced societies. The corona epidemic and imposing quarantine in all countries made the need for distance education a more serious issue all over the world. A most important thing in this type of education is the applications and programs that enable communication between educational service providers and audiences.

We usually face thousands of applications in searching for a specific educational program. Choosing among this software is a hard task. But the most important thing every user pays attention to at first glance is the appearance of the application. Designing a user interface is very important in application programming and development.

Samargandi (2021) in a study, "Designing User Interface and Evaluating Mobile Applications", states that considering the needs of customers in designing user interface improves more valuable and satisfying programs in designing user interface and evaluating programs. Makram Soui, Mabrouka Chouchane (2021) in a study, "Effect of Aesthetic Defects on the Maintainability

of Mobile Graphical User Interfaces: An Experimental Study", stated that mobile applications become one pillar of the software market with the evolution of smartphones. Pradip Peter Dey, Bhaskar Raj Sinha, Mohammad Amin, Hassan Badkoobehi (2019) argue in their research, "Best Practices for Improving User Interface Design", that recent studies have shown significant advancement in design practices of user interface. The article's proposed items are more applicable in dealing with aspects of the graphical user interface that are not present in the standard UML. UML seems to have defects without GUI-related constructs.

Pinnaree Kureerung, Lachana Ramingwong (2019) state in their study, "Factors supporting the design of the user interface of government mobile applications", that learning ability is more important in the development of government mobile applications. Radoslava Kravele (2017) in their study, "Designing User interface for a mobile application based on children's opinions", states that smart mobile phones are becoming more popular with children's lives day by day. Therefore, developing suitable applications for them is very important. What is important is the methods that make the applications attractive and simultaneously suitable for all users. Khan Kalimullah and Donthula Sushmitha (2017) found in their study titled "Improving User Experience for Older Adults through Design Elements" that modifying design elements and user interface can enhance the experience of older users when using applications. Dr. Lucrezia and Dr. Mariona (2016) in their research, "Analysis of the interactive design of the best educational applications for children zero up to 8 years", pointed out that specialized websites and blogs are often considered in selecting programs because of the lack of an industry standard or official rating system for children's programs.

Distance education in Iran is a new thing that is struggling with many problems. The lack of perfect applications is also strongly felt besides problems such as the lack of proper training for teachers and students to understand online education and smart devices. Educational applications should have such a design that they are usable easily and without special training. These mobile software should be made for the desired age groups and their target groups and have attraction to the learners. Thus, this research examines the design of the application user interface.

Designing User interface

A user interface in Microsoft terminology is a point where two things are connected so that they can work together. It is a part of software that enables a program to work with a user or another program, such as an operating system or hardware. A user interface can be an interface, a command line, a menu, or a graphical interface. Don Norman says: Everything sends an emotional signal, even when the designer's goal is not to evoke emotion. Individuals who see a website infer its personality and experience its feeling.

The user interface is the interface between the human and the device that allows the human to use the device. A user interface is a visual part of a tool that the user directly interacts with. Everything in information technology that acts as an interface between the user and the screen is called a user interface (Jennifer Preece, 2015).

Designing user interface is a subset of the discipline called human-computer interaction. Human-Computer Interaction is a study, planning and design of interaction between humans



and computers that leads to meet individuals' expectations optimally. HCI (human-computer interaction) designers must consider many things: individuals' expectations, their physical and skill limitations, the function of information processing systems, and charming things for individuals. Designers should also consider the technical features and limitations of hardware and software (Galitz, 2007, 4). Indeed, the user interface is a part of the software, or an environment in computer systems, including databases, software, sites, and the like, which creates interaction between the machine and the user (Yu and Lin, 2002).

The user interface has a great mental impact on the user and actually conveys the thoughts of its designers to the user. This effect is a factor through which the user gets a correct understanding of the database and uses it properly. A good user interface will make the site attract many users and not lose them during use or in later stages (Yu and Lin, 2002).

Mobile learning is a subcategory of e-learning, and e-learning is a macro concept that includes mobile learning and online environments. Digital learning is a tool that addresses multiple challenges the educational institutions, community leaders, and policymakers face, and helps learners to communicate with a high-quality College in remote areas and with career courses taught by a highly skilled on teacher who does no work in their school. Digital learning can be very useful for educators who actually face many obstacles to meet student needs (Sujit Kumar Basak, Marguerite Wotto, and Paul Be'langer, 2018). Students can easily buy e-books and can download them to their devices through mobile-learning (Geist, 2011). We need appropriate mobile applications and software to take advantage of mobile-learning that not only makes distance learning easier but also increases the interest and enthusiasm of teachers and learners.



Styles in designing application user interface

Flat and integrated design is a design in which proceeds without colorful photos, shadows, different textures, 3D rendering and visual effects; all the elements in the design are one-dimensional and sometimes two-dimensional. The colors are integrated. Flat design mostly uses geometric shapes and straight lines, and its coloring of the design should be used intelligently. One of the best advantages of the flat design is the clarity of the edges of the lines and the beautiful combination of this type of design with the fonts, especially if it uses the proper color set. There are a good deal of software for flat design, but the software the Google also recommends is Adobe Illustrator and Adobe Muse; the designer should try to design the projects in vector software and prepare a suitable vector output from the design. For example, SVG format is common for web designers and PDF for print designs (Bloch, 1995, 29).

Material design cares too much about the grid system and animation, and depth and shadow are very important for the designed elements. Google claims that the new material design language is inspired by ink and paper. "Mathias Dorit", a famous designer, says that just as the objects in the real world are sensible and have length, width and height, the same feelings should be conveyed in this type of digital design.

Skeuomorphism is a style of graphic design that tries to depict the desired object in the real world in the same way, and it is an opposite of flat design and makes the objects to appear as they are in the audience's mind. Skeuomorphic design gradually showed itself since the emergence of computers and mobile phones (Lavie, Tractinsky, 2004, 275).

One of the new styles that have become popular today in social networks such as Dribble, Instagram and some Facebook groups is neumorphism. This style is a combination of two user interface design styles, one of which is skeuomorphism and the other is material design, and it has inherited its own advantages and characteristics from both styles.

Gamification in designing user interface

Gamification is a complex design technique that requires a use of different game mechanics regarding interactive user interface elements. The principal task of designers who use gamification is not to turn a product completely into a game. Hence, effective game mechanics commonly used in design are distinguished. Some of the key elements of gamification in user interface design are the creation of challenges, scoring, badges and labels, ranked players list, game path and restrictions.

Motion is an essential part of the language the designers used to communicate with users. Animation is used to describe the spatial relationships between the states and actions of individual elements. Mindful design choices can make the user's experience better. Animation tells stories about our products - it shows the organization of an application and users' work with it. Animation moves the user - it defines navigation and creates a more natural experience by adding a level of depth to interactive design. Whenever the audience interacts with your product, you may ask yourself these three questions: What is the most important possibility of this page? What should I do next? Did I do the right thing? (Gavrilov, 2022) These questions help us determine areas that need improvement in order to enhance the user experience.

As for UI design, images can be paintings, sketches, graphic designs, or printed artwork. These images are usually used to clarify, decorate, or visually display complex text or ideas. User interface designers use images in their designs for various purposes, with the primary goal being to enhance the user experience. Adding images to tutorials and internal pages makes the process attractive and understandable. Actually, you show how to do something. Similarly, you can use images to explain better. Images are visual elements and so are usually understood faster than text. This makes it easier for the user to understand the message you want to send quickly. It's great for skimmers (those who skim through text and ignore details) who ignore text and rely more on visuals during browsing sessions to find what they're looking for.

When we are designing an application, the question arises: what kind of icon should we use, which can be beautiful, quickly recognized and more efficient? The first classification for icons is their linearity or solidity. You might think they are just different in appearance, but researches have shown that one is more recognizable than the other. A research, "Solid Icons vs. Linear Icons: Impact of Icon Style on Usability," found that icon style affects performance. Application performance was measured by the speed and accuracy of icon recognition and selection. Solid icons were recognized faster than linear icons, with a few exceptions. Some icons show no difference in working time. This depends on the characteristic signs.

Icons in designing user interface

Characteristics are what users benefit from them to identify icons. If the characteristics are absent or hardly noticeable, the icon becomes unrecognizable. For example, the tail of the



comment icon (as a cloud) is its characteristic. It is simply a circle without it. The keyhole on the lock icon is its characteristic. It's easy to mistake the icon for a bag without it. The teeth on the industrial wheel icon are its characteristic. It looks like a donut without it. These characteristics are what users rely on to recognize the icon. Make sure, when using icons, they include all the characteristics that users need to identify them. If a symbol can look like a unique object, consider adding additional characteristics to it.

Use a linear style when signs are features of a subtle symbol and appear at the edges of a shape. This style highlights these icons more, which leads to faster recognition. It is better to stick to a consistent style in choosing icons. Choose a set of icons that have characteristics with sharper angles instead of mixing solid and linear styles.

Most icons represent physical objects in the real world. These objects are solid and appear as ghosts. Viewing icons as linear drawings is not a realistic representation of what most individuals are used to seeing. Therefore solid icons are recognized faster. However, users can still recognize linear icons. But if the lines of the icon shape are too close to each other, it will take longer to do this.

Here's a thing you should keep in mind when using icon styles: Icons comprise characteristics that should be recognizable and salient. Solid icons are recognized faster, unless their signs are subtle and not prominent enough. Linear icons are more recognizable when they have a wide inner space. If the solid version has subtle characteristics on the edges, use linear icons. If the linear version creates narrow internal spacing, use solid icons (Arledge Curtis, 2014).

Typographic system is a most basic part of user interface design. Choosing the right fonts for user interface designs doesn't just mean choosing web-safe fonts. If your users are unable cannot read your website or your app because of bad typography or small size, you should immediately say goodbye to them. Hence, even a basic understanding of typography means you can determine the best fonts for modern UI design and various design projects. Text is never just text, and is often overlooked in good design, but good type design can evoke emotions, attract the attention of the audience and even create a typographic identity. In contrast, bad typography is seen. Even for non-designers, bad typography is easily recognizable. It damages the brand and creates a bad user experience, even if users can't specifically explain why.

Color is a fastest way to convey messages and meanings. Before today's human species know the aesthetic value of color, there were more diverse experimental ways of communicating through color. The humans in nature have always depended on their ability to recognize objects or the warning messages of these objects. These messages have been an integral part of the path of human cognition that they have reached them by animals, plants, minerals and other colored objects. It is noteworthy that color influences strongly all human emotions, stimulates it; it is a symbol of abstract mentalities and various thoughts, and simultaneously, it expresses euphoria, the desire for evolution, and reminds of another time and place that creates an aesthetic sense or emotional reactions in humans (Eiseman 2018, 8 and 10).

Colors are also very important in designing user interface, because icons and texts are the same objects in the real world in this virtual space, and it is important they convey their message



correctly. Undoubtedly, color plays an important role in conveying these messages and expressing their performance. Therefore, this section will examine the basic concepts of color.

A look at one of the presently most popular educational applications

This review is examining the design and user experience of Duolingo, a language learning app used by over five hundred million users worldwide. Duolingo's daily lessons, by implementing a gamification approach to education, happy cartoon mascots and mind-engaging methods, make feeling more like an addictive mobile game than a self-improvement program. We will examine, in the following, the user experience and user interface of this application as an application with the highest number of downloads in the world.

Harmony between the system and the real world: This is one of Jacob Nilsson's "usability" rules for interactive design, which is essential for language teaching. Duolingo, with a universal design that transcends linguistic and cultural differences, introduces unfamiliar words using through cartoon drawings and familiar sentences that reflect how people actually speak. The content is more relevant to the language you are learning. For example, Dutch lessons refer to Dutch culture and traditions.

Duolingo, with progress circles that track goal completion, total daily points, inspection points, and ranked leaderboards where users move up and down leagues based on weekly point accumulation, encourages daily use of the app as a game through competition with a coherent design and positive reinforcement. For example, it celebrates the correct answers with joyous songs and dancing mascots.

If you're looking for a way to reach 500 million downloads, make it easy to start. Users choose a language after downloading, and go to a language lesson before requesting registration. This is a very easier way. Only name, email and password are required for registration.

The app icon is a cute and colorful cartoon bird that looks like an addictive mobile game. Many individuals have said in surveys that when they open their mobile phones, they unconsciously click on the Duolingo icon and open the program. The choice of green color as the color used by many messengers is not without effect. Its general aesthetic is justified by a flat style design and a bit of Google Material Design.

Another Nilsson's principle: Duolingo places a progress bar at the top of the screen to show users the progress of the lesson. Each lesson takes only 5-10 minutes and is easily transferred to the next lesson. (Although it's easy to touch (X) and exit at any time - user control and freedom!) Loading times aren't too long, and Duolingo fills that little time with helpful hints and fun facts.

CONCLUSION

Nowadays, using mobile phones by all people in different age groups is undeniable. Although mobile phones were initially only used as a tool for making phone calls, today these devices are used for communication and calling, playing, creativity and learning.

Increasing mobile phone users and its applications causes to increase the number of mobile software and applications. Applications for virtual communication, planning, creativity, video and photo editing, and educational programs are, besides games, applications that are widely



used by different people. Educational applications are very important because of the time of use and the age of the users. Using the Internet and online services is also increasing every day. There are almost no companies and educational places in the world, even in developing countries, that do not use the Internet. Many advanced countries have made virtual and online education a part of their educational program and they can teach students all over the world through these facilities without the need to attend classes and specific places. Improving the level of education and research through online platforms is very significant.

Teaching and learning have changed strongly over the past twenty years because of the impact of information and communication technology. The most important consequence of such changes is the increasing spread of electronic education. Electronic education tools should be developed relying on the psychology of learners. There are many studies on learning and its effective factors. Obviously, any design for electronic education must consider such studies in depth. The principles of conventional (non-electronic) education should also be observed with some adaptations to electronic education. However, such adaptations create fresh problems that may conflict with distance learning in other ways.

One of the important psychological issues is the user interface in electronic education, because the user interface (UI) is the point of interaction between the user and the educational body. Using an application and the ease of learning it are under the influence of the user interface. If such correlation fails, the training objectives may not be achieved, even if the training content is well chosen and the user will learn. Hence, the main issues in successful correlation, which should be considered in the design of user interface for electronic education and educational applications, are the focus of this study.



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