

## **“User Experience (UX) Design and Mobile Applications”**

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## Abstract

In today's digital era, mobile applications have become indispensable tools for communication, productivity, and entertainment. Yet, the success of these apps doesn't solely rely on their functionality; it hinges greatly on the quality of the user experience (UX) they offer. This study delves into the intricate relationship between UX design and mobile applications, with a focus on pinpointing common challenges, effective strategies, and the profound impact of UX design on user satisfaction, engagement, and retention.

To accomplish this, a descriptive cross-sectional study was conducted through a questionnaire administered to 100 respondents consisting of Mobile App Users, Mobile App UX Designers, and Developers from select Saudi companies. Through our research, we uncovered several effective strategies for optimizing UX design, including the integration of user feedback, adherence to UX design principles, and prioritization of performance optimization.

Moreover, our findings illuminate a strong positive correlation between well-crafted UX and crucial performance indicators such as user satisfaction, engagement metrics, and retention rates. Building upon these insights, we propose actionable recommendations aimed at enhancing UX design in mobile applications. By implementing these suggestions, organizations and UX professionals can elevate the quality of UX design, thus fostering heightened user satisfaction, deeper engagement, and enhanced retention amidst an increasingly competitive digital landscape.

**Key words:** User, User Experience Design, Mobile Applications, Engagement, Satisfaction, Retention.

## الملخص

في العصر الرقمي الحالي، أصبحت تطبيقات الهاتف المحمول أدوات لا غنى عنها للاتصال والإنتاجية والترفيه. ومع ذلك، فإن نجاح هذه التطبيقات لا يتوقف التي تقدمها. يستكشف هذا البحث التقاطع بين تصميم تجربة المستخدم وتطبيقات (UX) فقط على وظائفها ولكن أيضًا على جودة تجربة المستخدم الهاتف المحمول، بهدف تحديد التحديات المشتركة والاستراتيجيات الفعالة وتأثير تصميم تجربة المستخدم على رضا المستخدم ومشاركته والاحتفاظ به. تم والمطورين من UX إجراء دراسة وصفية مقطعية باستخدام استبيان بين ١٠٠ من مستخدمي تطبيقات الهاتف المحمول ومصممي تطبيقات الهاتف المحمول بعض الشركات السعودية.. تتضمن الاستراتيجيات الفعالة لتحسين تصميم تجربة المستخدم دمج تعليقات المستخدمين، والالتزام بمبادئ تصميم تجربة المستخدم، وإعطاء الأولوية لتحسين الأداء. علاوة على ذلك، تكشف الدراسة عن وجود علاقة إيجابية بين تجربة المستخدم المصممة جيدًا ومؤشرات الأداء الرئيسية مثل رضا المستخدم، ومقاييس المشاركة، ومعدلات الاحتفاظ. وبناء على هذه النتائج، تم اقتراح توصيات لتحسين تصميم تجربة المستخدم في تطبيقات الهاتف المحمول. من خلال تنفيذ هذه التوصيات، يمكن للمؤسسات ومحترفي تجربة المستخدم تحسين جودة تصميم تجربة المستخدم في تطبيقات الهاتف المحمول وبالتالي زيادة رضا المستخدمين ومشاركتهم والاحتفاظ بهم في مشهد رقمي متزايد التنافسية.

**الكلمات المفتاحية:** المستخدم، تصميم تجربة المستخدم، تطبيقات الهاتف المحمول، المشاركة، الرضا، الاحتفاظ.

## Introduction

Mobile applications have become essential tools in today's digital world, easily integrating into all facets of everyday life. Mobile apps have revolutionized the way people engage with technology, impacting several aspects such as communication, entertainment, productivity, and commerce (Pelet, 2017). The success of these applications relies heavily on the notion of User Experience (UX) Design, which involves a comprehensive approach to creating interfaces that are intuitive, captivating, and focused on the user.

The intersection of UX Design with mobile applications is a complex and intriguing field that requires thorough investigation. UX Design involves comprehending users' behaviors, requirements, and preferences in order to develop experiences that not only fulfill but above their expectations (Earnshaw et al., 2017). When implemented in mobile applications, UX Design becomes increasingly crucial because of the distinct limitations and possibilities offered by the mobile platform.

Usability is a fundamental aspect of this study, as it is crucial for creating a favorable user experience (Chouki et al., 2021). Mobile applications should include a high level of intuitiveness and ease of navigation, guaranteeing that users can easily complete their jobs without experiencing any aggravation. In addition, the importance of accessibility in UX Design, especially in the context of mobile applications, cannot be underestimated (Ballantyne et al., 2018). In order to accommodate a growing and diverse range of users with different abilities and requirements, it is crucial for mobile applications to be inclusive and accessible to all individuals.

Aside from usability and accessibility, aesthetics and user engagement are essential elements of UX Design for mobile applications (Sutcliffe, 2016). The importance of visual design is crucial in molding users' perceptions and emotions, hence influencing their overall experience with the application. Similarly, elements such as interactivity, feedback mechanisms, and gamification approaches have a role in promoting engagement and creating a feeling of deep involvement within the application.

Furthermore, this study seeks to investigate the changing terrain of mobile technology and its consequences for UX Design. Due to the widespread use of smartphones, tablets, wearables, and other mobile devices, designers must adjust their design techniques to fit various sizes and ways of interacting with these devices. Moreover, the advent of novel technologies such as augmented reality (AR), virtual reality (VR), and artificial intelligence (AI) brings about both prospects and difficulties for UX Design in the mobile context.

## Problem Statement

Notwithstanding the exponential growth of mobile applications in diverse fields, a considerable proportion of these applications face obstacles when it comes to providing ideal user experiences (UX). Users may experience frustration and discontent due to challenges such as convoluted interfaces, confusing navigation, and sluggish operation. Complicating matters is the variety of user demographics and utilization contexts that are present in the mobile environment; this complicates the task of designers and developers in their endeavor to produce experiences that are both universally appealing and easy for users to navigate.

New technologies, platforms, and design trends emerge at an even quicker rate, further complicating the ever-changing mobile application development environment. UX designers encounter both advantageous prospects and formidable obstacles in this ever-changing milieu. In an effort to produce indelible and uninterrupted experiences, they are tasked with maneuvering through intricate technical prerequisites, platform limitations, and user anticipations.

Moreover, the significance of UX design in the triumph of mobile applications cannot be exaggerated. Extensive research has continuously demonstrated that users are prone to swiftly abandon applications that fail to satisfy their expectations, with subpar user experience (UX) being identified as one of the main factors leading to uninstallation. Furthermore, in a highly competitive industry, where numerous new applications are launched on a regular basis, providing an exceptional user experience is crucial for obtaining a competitive advantage, maintaining users, and promoting long-term involvement and loyalty.

Hence, the main focus of this research is to uncover the principal barriers and difficulties encountered by UX designers and developers in crafting outstanding user experiences for mobile applications. By comprehending the fundamental origins of these problems, we may formulate effective tactics, guidelines, and exemplary methods to surmount them and improve the overall caliber of user experience in mobile applications. The ultimate objective is to enhance user pleasure, boost the rate at which apps are adopted and retained, and contribute to the triumph and durability of mobile applications in a progressively competitive digital environment.

## Study Objectives

1. To identify common challenges and obstacles faced during using mobile applications.
2. To explore effective strategies and best practices for optimizing UX design in mobile applications.
3. To evaluate the impact of UX design on user satisfaction, engagement, and retention.
4. To propose recommendations for improving UX design in mobile applications.

## Study Significance

Improving user satisfaction and experience is of the utmost importance in the current digital age, where mobile devices and smartphones have become indispensable components of our everyday routines. Given the widespread use of mobile applications for purposes such as productivity, entertainment, and communication, the user experience quality is a critical factor in determining the success of such applications. Consequently, it has become critical for individuals and organizations operating in the mobile industry to prioritize the provision of a smooth and enjoyable user experience.

This study is of considerable significance in the domain of user experience and satisfaction in the mobile application environment. In an era where smartphones and mobile applications are becoming more prevalent in every aspect of life, it is critical to prioritize the provision of a smooth and enjoyable user experience. Through an exploration of the fundamentals, tactics, and obstacles of user experience (UX) design in mobile applications, this study seeks to detect potential avenues for augmenting user contentment.

For mobile applications, optimizing the overall user experience can result in a multitude of advantages. To begin with, it has the potential to enhance user engagement by encouraging repeat visits and interaction with applications that deliver a positive and pleasurable experience. An optimally planned user experience (UX) has the ability to engross users, promote investigation, and facilitate seamless interactions; consequently, these factors contribute to increased engagement metrics, including session duration, frequency of use, and depth of interaction.

Additionally, increased retention rates can be attributed to a positive user experience, since users are more unlikely to deactivate or abandon applications that adequately fulfill their requirements and anticipations. Users can be incentivized to maintain a consistent and loyal relationship with mobile applications by fostering a sense of loyalty and trust through the resolution of pain points, reduction of friction, and optimization of usability.

Moreover, favorable word-of-mouth endorsements can be generated in response to a satisfactory user experience, thereby exerting a substantial influence on the prosperity of mobile applications. App acquisition, organic growth, and increased app downloads result from happy customers who are more inclined to share their favorable experiences with family, friends, and coworkers. Additionally, positive reviews and recommendations have the potential to bolster the app's standing and

trustworthiness within the marketplace, thereby propelling its growth and acceptance.

## Limitations of the study

1. **Sample Size:** The findings of the study might be constrained by the sample populations in terms of size and diversity. The sample's representation of the mobile app system's diverse range of consumers, developers, and stakeholders may be limited, contingent upon the research methodology implemented.
2. **Geographical Factors:** Geographical and cultural factors may exert an influence on the research, especially when the study concentrates on a particular region or demographic. The potential for substantial variation in user preferences, behaviors, and expectations across diverse regions and cultures could have an effect on the applicability of the results.
3. **Methodological Limitations:** The potential existence of inherent limitations in the research methodology utilized may have an impact on the validity and dependability of the results. For example, the utilization of surveys may incorporate potential sources of error or bias into the results of the research.

## Definition of key terms

1. **User Experience (UX):** The overall experience of a person using a product, system, or service, encompassing aspects such as usability, accessibility, satisfaction, and emotional responses (Berni & Borgianni, 2021).
2. **Mobile Application:** A software application specifically designed to run on mobile devices such as smartphones and tablets (Weichbroth, 2020). Mobile applications offer various functionalities, including communication, productivity, entertainment, and utility, and are typically downloaded and installed from app stores or marketplaces.
3. **UX Design:** The process of designing products and services with a focus on enhancing the overall user experience (Berni & Borgianni, 2021). UX design involves understanding user needs, creating intuitive interfaces, and optimizing interactions to meet user goals effectively and efficiently.

## Literature Review

### 1. Definition and Importance of UX Design

User Experience (UX) design is a fundamental component in the development of digital products that surpass user expectations. It incorporates a comprehensive strategy that seeks to comprehend user behaviors, requirements, and inclinations in order to design intuitive, effective, and pleasurable experiences (Ferreira, 2016). In addition to visual appeal, UX Design places emphasis on the complete user experience, guaranteeing that each interaction, starting from the moment of encountering the product to the conclusion of the intended task, is smooth and gratifying. User-experience (UX) designers employ principles derived from design theory, psychology, and human-computer interaction to fabricate interfaces that not only operate optimally but also inspire favorable sentiments in users and foster confidence (Stull, 2018).

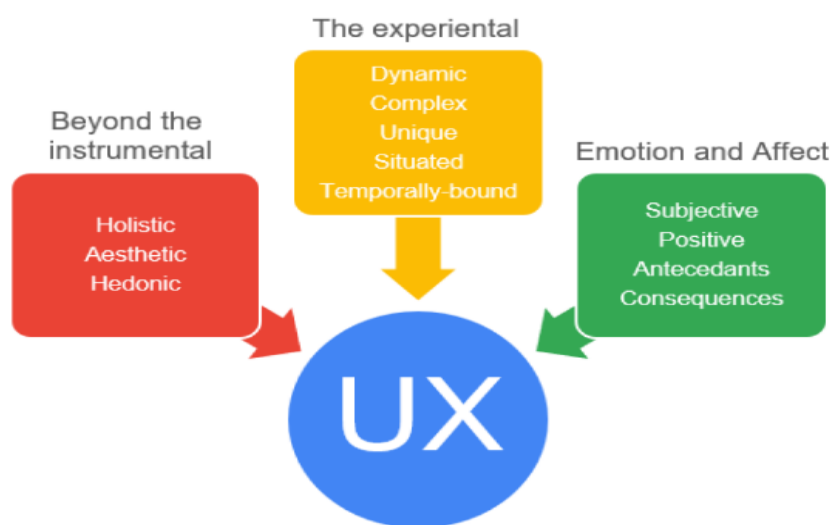
When it comes to mobile applications, where users frequently engage with devices in brief periods of time while on the move, UX Design becomes even more crucial. Mobile applications encounter challenges such as restricted screen space, inconsistent device capabilities, and environmental distractions (Feng & Agosto, 2017). In order to overcome these obstacles, effective mobile UX design places a premium on efficiency, clarity, and simplicity in the design process. The process entails reducing cognitive load, streamlining workflows, and optimizing touch interactions so that users can complete their duties efficiently and effectively.

The importance of UX Design in mobile applications transcends mere usability as it has the potential to influence critical business metrics. Enhanced user engagement, increased retention rates, and ultimately, improved customer satisfaction and loyalty can result from a mobile application that is meticulously designed (Hartson & Pyla, 2018). In a progressively competitive app market characterized by an abundance of choices for users, the ability to provide an exceptional user experience frequently serves as the distinguishing element that elevates successful applications above their competitors.

Moreover, mobile UX Design has wider ramifications for brand perception and market placement. An app that provides a pleasant user experience not only enhances the reputation of the app itself, but also contributes to the positive perception of the brand associated with it. Users are more inclined to link pleasant feelings and perceptions with brands that offer them intuitive and pleasurable mobile experiences. In contrast, a subpar mobile user experience (UX) has the potential to damage a brand's image and cause people to migrate to rival companies.

### 2. Elements of the UX

Designing the user experience is a process that focuses on the needs and preferences of the user. The primary drivers behind the utilization of technology are gaining understanding, experiencing enjoyment, and engaging in social interaction. The UI/UX of an interactive mobile application has a direct impact on the emotions and impressions experienced by users. User experience (UX) is extremely advantageous in validating commands, keywords, and icons. When developing useful mobile apps, it is important to take into account the language, cognition, and social interpretations of both the user and the community. Figure 1 illustrates the fundamental concept of UX design.



**Figure (1): Facets of the UX** (Sandesara et al., 2022)

The golden rule states that a positive user experience is achieved by meeting human demands for autonomy, proficiency, self-oriented enjoyment, social connection, and others-oriented recognition through contact with a product or service. This is

known as the hedonic quality, which encompasses stimulation, identification, and evocation. The cognitive psychology and thought processes of users play a crucial role in determining the suitable user experience for mobile applications.

### 2.1. Goal Fulfillment

The attainment of objectives might motivate a mobile developer to generate mobile design interfaces that are more engaging and dynamic. Nevertheless, a lack of usability can hinder the attainment of active be-goals. Therefore, in order to accomplish effective be-goals, individuals must employ technology to cultivate independence, knowledge, social connections, inspiration, and popularity (Hassenzahl, 2008). All objectives of be-goals must be accomplished with consideration for the intended audience. From a design standpoint, a highly interactive product should facilitate the attainment of practical goals. However, without a constant offering of pleasurable quality (the perceived ability of the product to fulfill emotional goals), the product remains uninteresting. The main focus is on enhancing the convenience and satisfaction of the end user. Therefore, their emotions and psychological condition are essential in creating the user experience (UX) of any mobile application. Hence, it is crucial to acknowledge and comprehend the significance of a proficient framework for a wide range of UI/UX design procedures, including human cognitive processes and subjective satisfaction (Hassenzahl & Tractinsky, 2006).

### 2.2. Usability

The various attributes of the International Organization for Standardization (ISO), such as stability, learnability, understandability, and operability, indicate the level of user-friendliness of a mobile application. In addition, the Nielson model, as described in (Nielsen, 2018), builds upon the ISO model by integrating additional aspects. These features include efficiency, satisfaction, learnability, memorability, and errors, with the aim of enhancing UX design patterns. The authors (Harrison et al., 2013) offer a framework called People At the Centre of Mobile Application Development (PACMAD), which incorporates the qualities of both the ISO and Neilson models. Additionally, PACMAD considers cognitive burden, making it a comprehensive strategy for usability assessment. Moreover, acquiring valuable comments and insights from unfamiliar users at the earliest opportunity enables the developer to swiftly enhance the usability of the mobile application. To improve usability, the most straightforward and efficient method is to do interface assessments that encompass three crucial elements: users, their activities, feedback, and user evaluation (Kamizi, 2021).

### 2.3. Utility Satisfaction

Fox (2017) found that privacy concerns, ethical difficulties, and hidden app prices have the most significant adverse effect on app ratings, hence influencing mobile application reviews. This highlights the significance of establishing user confidence and fulfilling expectations in the application. It is crucial to meet the consumers' requirements in order to achieve the objective of a mobile application. Mobile users frequently desire commands that are tailored to their mood, personal preferences, mobility situations, and cost considerations across many media formats, including voice, video, animations, graphics, and text. To enhance user pleasure, it is necessary to give various media combinations together with the same material to accommodate different flexibility conditions (Subramanya & Yi, 2006).

An orderly and foreseeable sequence improves user contentment. Regular feedback fosters a feeling of confidence and reliance in the minds of users. An optimal approach to this task is empathizing with the consumers by adopting their point of view and gaining firsthand experience. Enhance the whole user experience and level of involvement with interactive products, focusing on more than simply the content they provide (Hassenzahl & Tractinsky, 2006). The user should not be perplexed by any unexpected behavior or unforeseen condition. The application should possess the capability to handle this particular situation with elegance and poise. The greater the recognition of user variety, the higher the quality of the mobile application will be.

## 3. Evolution of Mobile Applications

The trajectory of mobile application development has been an extraordinary one, characterized by technological progress, evolving user preferences, and fluctuating industry currents. At the outset, mobile applications were rudimentary in nature, serving primarily to deliver fundamental functionalities including phone conversations, text messaging, and elementary games (Cruz & Sarmiento, 2020). As a result of the proliferation of mobile internet connectivity and the introduction of smartphones, the mobile application landscape underwent a profound transformation. App distribution became more democratized with the advent of app stores, most notably the Google Play Store and Apple's App Store, which enabled developers to readily reach a global audience (Daubs & Manzerolle, 2016).

With the increasing power and capabilities of smartphones, mobile applications have developed to provide more advanced features and functionalities. This evolution resulted in the emergence of several app categories, such as social media, e-commerce, productivity, entertainment, and gaming, which serve a broad spectrum of user requirements and preferences. In addition, the emergence of mobile operating systems such as iOS and Android offered developers powerful frameworks and tools to design sophisticated and engaging app experiences (Vaupel et al., 2018).

The implementation of responsive design principles and adaptive layouts has significantly enhanced the functionality of mobile applications, guaranteeing uniform user experiences across a range of devices and screen resolutions (Cazañas & Parra, 2017). In addition, technological progress in mobile hardware, including the development of sensors, high-resolution displays, and enhanced processing capabilities, has facilitated the emergence of novel application experiences, such as location-based services, augmented reality (AR), and virtual reality (VR).

The development of mobile applications has also been influenced by shifting user expectations and behaviors. Present-day users have high expectations for mobile applications to be seamless, intuitive, and personalized; this has prompted developers to place a high value on user-centric design principles and UX optimization. Mobile applications have become an essential component of everyday life, enabling users to complete tasks, maintain connections, engage in entertainment, and retrieve information while on the move.

#### 4. Significance of UX Design in Mobile Applications

Figure 2 summarizes the user experience design (UXD) for mobile applications based on prior study conducted by de Paula et al. (2014), Ibrahim et al. (2015), and Kim et al. (2016).

No.	UXD Elements
1.	Ease of use
2.	Learnability
3.	User interface
4.	User satisfaction
5.	Security
6.	Behavioral intent
7.	Environment

**Figure (2): UXD for mobile application** (Yazid & Jantan, 2017)

When it comes to mobile apps, User Experience (UX) Design is crucial since it determines how users engage with the app, how they perceive it, and how satisfied they are with it overall. Designing with the user's wants, needs, and habits in mind is central to user experience (UX) theory and practice. User experience design (UXD) takes on added significance in mobile app contexts where users anticipate effortless and natural on-the-go encounters.

Primarily, UX Design has a direct influence on the level of user engagement and the ability to retain users in mobile applications. An app with a well-thought-out design that provides easy-to-use navigation, organized information structure, and seamless interactions motivates users to spend more time and discover more functionalities (Maioli, 2018). On the other hand, an app that is badly designed with complicated arrangements, concealed features, or difficult processes may cause users to become frustrated and result in a significant number of users giving up on using the app. Investing in UX Design is crucial for promoting user engagement and facilitating sustained usage of mobile applications.

Furthermore, UX Design has a substantial impact on user satisfaction and the overall perception of a mobile application and its associated brand. An optimal user experience fosters an enduring impact, cultivating sentiments of reliance, authenticity, and allegiance towards the application and the organization supporting it (Badran & Al-Haddad, 2018). Conversely, a terrible user experience can damage the reputation of the brand and result in negative word-of-mouth, which can affect future efforts to acquire and retain users. Thus, giving priority to UX Design not only improves the immediate user experience but also helps establish a robust and favorable brand image in the long term.

Moreover, UX Design has concrete ramifications for the achievement of company success and the ability to compete in the mobile app market. With the growing competition in the mobile app market, customers now have higher expectations for the experiences they come across (Kashfi et al., 2017). Applications that prioritize User Experience (UX) Design and provide seamless, intuitive, and personalized experiences have a higher likelihood of distinguishing themselves in a highly competitive market. Furthermore, contented users are more inclined to become brand champions, endorsing the application to others and contributing to natural expansion and user acquisition.

Moreover, UX Design is essential in influencing conversions and attaining corporate objectives in mobile applications. A well-designed user experience can effectively guide users through the conversion funnel and promote desired activities, such as driving purchases, increasing subscriptions, or encouraging user interaction with content. UX Design has a direct impact on the efficacy of mobile apps in achieving their intended goals, by improving the checkout process and creating convincing calls-to-action.



## Previous Studies

According to (Huang, Z., & Tian, 2018) the advent of mobile application development has provided businesses with fresh options to promote their brands and products through a novel channel. This channel promotes a growing number of consumers who are actively participating in mobile applications. Nevertheless, the task of creating "functional" mobile applications continues to be a struggle. So far, there have been few research conducted on the identification of user experience features in the design of mobile applications. The objective of this study is to conduct a comprehensive assessment of the analysis and design of mobile applications, focusing on key design elements from the standpoint of user experience. The study has focused on three design dimensions: usability, functionality, and aesthetic design. The findings suggest that there is a need for additional enhancement in the design of present mobile applications in order to match users' expectations and satisfaction.

To the study of (Yazid & Jantan, 2017) the level of user acceptability is directly correlated with the success of an application. Prior to the creation phase, it is crucial to analyze user expectations and acceptance in order to create a successful product. User experience design (UXD) is a research discipline that focuses on understanding users' requirements, expectations, and acceptance as they interact with a product or service. As there are no existing UXD rules, we will be presenting the UXD approach for the mobile flight booking ticket application (MFBTA). MFBTA is a sophisticated application that encompasses many types of transactions, including dynamic interaction and ecommerce components that necessitate perceptible UXD aspects. According to the observation, it is evident that the user experience design (UXD) in MFBTA still needs improvement in order to meet the high standards of user acceptability and expectation.

According to (Ibrahim et al., 2015) this paper discusses a study that evaluates the user experience of a mobile application named MFolktales, which focuses on folktales. The study utilizes user experience questionnaire tools to gather data. The aim of this study is to evaluate the importance and influence of the MFolktales mobile application on its users. The development of the MFolktales mobile application is based on a proven conceptual model. The study involves analyzing and defining the design concepts and needs. This application comprises a module dedicated to animation storytelling and many modules featuring various games, all designed with the objective of introducing Malay traditional stories to youngsters. The MFolktales received a favorable impression from users and was recognized as a high-quality product.

## Methodology

### 1. Study Design

This study relied on the descriptive analytical approach, as this approach aims to describe the phenomenon, study it on the ground, and obtain data from its primary sources. The descriptive analytical approach means “one of the scientific methods for describing the subject to be studied through a correct scientific methodology and depicting the results that are reached in the form of expressive digital information that can be interpreted” (Connaway & Radford, 2021).

### 2. Research Method

Research methods are the systematic procedures or techniques used by researchers to collect, analyze, and interpret data in order to answer a research question or test a hypothesis. These methods provide a framework for conducting research, ensuring that the study is well-organized, reliable, and valid. Research methodology encompasses the overall approach and strategy employed in a research study (Kapur, 2018).

The researcher used a quantitative approach since it was appropriate for the study's goals and objectives.

### 3. Study Population

The study population refers to the entire group or collection of individuals that share common characteristics or attributes and are of interest to the researcher for a specific study (Sileyew, 2019). It is a fundamental concept in designing and conducting research as it defines the scope and boundaries of the investigation. The study population is central to determining which individuals or units will be the focus of data collection and analysis.

The study population included 100 of Mobile App Users, Mobile App UX Designers and Developers from some Saudi companies. The researcher distributed the questionnaire electronically through Google Forms to collect the largest number of members of the study population.

### 4. Data collection

Data collection is a fundamental component of research methodology, essential for gathering information and evidence to support the research objectives (Igwenagu, 2016). It involves the systematic process of obtaining, recording, and analyzing data from various sources and methods to address specific research questions. The primary purpose of data collection is to generate empirical evidence that can be used to draw meaningful conclusions and insights.

In order to achieve the objectives of the study; All data and information were based on two types of sources:

#### 4.1. Secondary Sources

Secondary sources are vital references and materials that provide existing data, information, or knowledge that has been collected, analyzed, and documented by someone other than the researcher. These sources serve as a valuable resource for researchers to support their studies and investigations, as they offer pre-existing data or insights, often in the form of published literature, or reports (Ajayi, 2017).

The information was gathered from a variety of secondary sources, including published books and articles.

#### 4.2. Primary Sources

Primary sources are foundational elements of data collection that provide original, firsthand information or evidence directly related to the research topic. These sources are essential as they offer data that has not been interpreted, summarized, or filtered through the lens of previous researchers or intermediaries (Pandey & Pandey, 2021).

To achieve the objectives of the study, study data were collected by distributing a questionnaire to the study population.

### 5. Data Analysis

The term "data analysis" is used to describe the methodical and structured procedure of examining, cleaning, manipulating, and analyzing data acquired for the purpose of drawing conclusions, answering research questions, or putting hypotheses to the test. At this stage, researchers use a variety of statistical and computational methods to interpret the collected data (Davidavičienė, 2018).

In this study, the questionnaire results are examined using SPSS for statistical analysis.

## Results

### 1. Demographic Questions

It is clear from the following table on the distribution of the study sample by gender that the proportion of males is 96%, and females 4%.

**Table 1: Gender**

Gender				
		Frequency	Percent	Valid Percent
Valid	Male	96	96.0	96.0
	Female	4	4.0	4.0
	Total	100	100.0	100.0

### 2. Age

It is evident from the following table regarding the distribution of the study sample according to age, that the highest percentage is (35 - 44 years) with 40%, followed by (25–34 years) with a percentage of 21%, (15–24 years) with a percentage of 20% (45 - 54 years) with a percentage of 11% and (More than 55 years) with a percentage of 8%.

**Table 2: Age**

Age				
		Frequency	Percent	Valid Percent
Valid	15–24 years	20	20	20
	25–34 years	21	21	21
	35 - 44 years	40	40	40
	45 - 54 years	11	11	11
	More than 55 years	8	8	8
	Total	100	100.0	100.0

### 3. Are you comfortable dealing with your mobile applications?

It is clear from the following table that most of the study sample comfortable dealing with delivery application, with a percentage of 73%.

**Table 3: Are you comfortable dealing with your mobile applications?**

Are you comfortable dealing with delivery application?				
		Frequency	Percent	Valid Percent
Valid	Yes	73	73	73
	No	27	27	27
	Total	100	100.0	100.0

### 4. Job Description

It is clear from the following table on the distribution of the study sample by job description that the proportion of Mobile App Users is 64 %, and Mobile App UX Designers and Developers 36%.

**Table 4: Nationality**

Job Description					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Mobile App Users	64	64.0	64.0	64.0
	Mobile App UX Designers and Developers	36	36.0	36.0	100.0
	<b>Total</b>	100	100.0	100.0	

## 2. The Challenges faced during using mobile applications

- ✓ Statement “**I often encounter challenges related to navigating through mobile applications smoothly**” came in the first place with an arithmetic mean of 4.21 and a standard deviation of .902. Therefore, the direction of the responses of the study sample is Agree.
- ✓ Statement “**I believe that dealing with privacy concerns or data security issues related to mobile applications is a common challenge**” came in the second order, with a mean of 4.13 and a standard deviation of .884. Therefore, the direction of the responses of the study sample is Agree.
- ✓ Statement “**I believe that adjusting to frequent updates or changes in the user interface of mobile applications can be challenging**” came in the third order, with an arithmetic mean of 4.13 and a standard deviation of .812. Therefore, the direction of the responses of the study sample is Agree.
- ✓ Statement “**I believe that dealing with intrusive ads or interruptions while using mobile applications is a common annoyance**” in the fourth rank came with an arithmetic mean of 4.09 and a standard deviation of .818. Therefore, the direction of the responses of the study sample is neutral.
- ✓ Statement “**I believe that dealing with slow loading times or performance issues is a common challenge when using mobile applications**” came in the fifth order, and its arithmetic mean was 4.00 and a standard deviation was .888. Therefore, the direction of the responses of the study sample is neutral.

It was apparent from the table that the challenges faced during using mobile applications related to a variety of different challenges, including navigating through mobile applications smoothly, slow loading times or performance issues, dealing with intrusive ads or interruptions, adjusting to frequent updates or changes in the user interface and dealing with privacy concerns or data security issues related to mobile applications is a common challenge. Understanding these challenges is essential for devising effective strategies to overcome them and enhance the overall quality of UX in mobile applications.

*Table 5: Descriptive Statistics of the challenges faced during using mobile applications*

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
I often encounter challenges related to navigating through mobile applications smoothly.	100	2	5	4.21	.902
I believe that dealing with slow loading times or performance issues is a common challenge when using mobile applications.	100	1	5	4.00	.888
I believe that dealing with intrusive ads or interruptions while using mobile applications is a common annoyance.	100	3	5	4.09	.818

I believe that adjusting to frequent updates or changes in the user interface of mobile applications can be challenging.	100	3	5	4.13	.812
I believe that dealing with privacy concerns or data security issues related to mobile applications is a common challenge.	100	2	5	4.13	.884
<b>The challenges faced during using mobile applications</b>	100	3.00	5.00	4.1120	.48017
<b>Valid N (listwise)</b>	<b>100</b>				

*Table 6: Frequency & Percent of the challenges faced during using mobile applications*

S	Strongly disagree		not agree		Neutral		Agree		Strongly Agree	
	F	%	F	%	F	%	F	%	F	%
I often encounter challenges related to navigating through mobile applications smoothly.	-	-	3	3%	23	23%	24	24%	50	50%
I believe that dealing with slow loading times or performance issues is a common challenge when using mobile applications.	2	2%	2	2%	21	21%	44	44%	31	31%
I believe that dealing with intrusive ads or interruptions while using mobile applications is a common annoyance.	-	-	-	-	29	29%	33	33%	38	38%
I believe that adjusting to frequent updates or changes in the user interface of mobile applications can be challenging.	-	-	-	-	27	27%	33	33%	40	40%
I believe that dealing with privacy concerns or data security issues related to mobile applications is a common challenge.	-	-	3	3%	24	24%	30	30%	43	43%

### 3. The effective strategies for optimizing UX design in mobile applications

- ✓ Statement “I believe that staying abreast of emerging trends and technologies in the field of mobile UX design is important for continuously improving and innovating mobile app experiences” came in the first place with

an arithmetic mean of 4.22 and a standard deviation of .675. Therefore, the direction of the responses of the study sample is Agree.

- ✓ Statement “**I believe that adhering to established UX design principles, such as simplicity and consistency, leads to improved user experiences in mobile applications**” came in the second order, with a mean of 4.21 and a standard deviation of .832. Therefore, the direction of the responses of the study sample is Agree.
- ✓ Statement “**I believe that conducting thorough usability testing is an effective strategy for identifying and addressing usability issues in mobile app designs**” mean of 4.15 and a standard deviation of .687. Therefore, the direction of the responses of the study sample is Agree.
- ✓ Statement “**I believe that fostering collaboration and communication among cross-functional teams is essential for successful UX design in mobile applications**” in the fourth rank came with an arithmetic mean of 3.89 and a standard deviation of .751. Therefore, the direction of the responses of the study sample is neutral.
- ✓ Statement “**I believe that incorporating user feedback early in the design process is essential for optimizing UX design in mobile applications**” came in the fifth order, and its arithmetic mean was 3.87 and a standard deviation was .812. Therefore, the direction of the responses of the study sample is neutral.

It was apparent from the table that the effective strategies for optimizing UX design in mobile applications including some best practices as incorporating user feedback early in the design process, conducting thorough usability testing is an effective strategy, adhering to established UX design principles, such as simplicity and consistency, leads to improved user experiences, fostering collaboration and communication among cross-functional teams is essential for successful UX design and staying abreast of emerging trends and technologies in the field of mobile UX design is important for continuously improving and innovating mobile app experiences. By adopting these strategies, UX designers and developers can create mobile applications that deliver superior user experiences and drive user satisfaction, engagement, and retention.

**Table 7: Descriptive Statistics of the effective strategies for optimizing UX design in mobile applications**

Descriptive Statistics						
	N	Minimum	Maximum	Mean	Std. Deviation	p-value
I believe that incorporating user feedback early in the design process is essential for optimizing UX design in mobile applications.	100	3	5	3.87	.812	0.001
I believe that conducting thorough usability testing is an effective strategy for identifying and addressing usability issues in mobile app designs.	100	3	5	4.15	.687	0.001
I believe that adhering to established UX design principles, such as simplicity and consistency, leads to improved user experiences in mobile applications.	100	2	5	4.21	.832	0.320
I believe that fostering collaboration and communication among cross-functional teams is essential for successful UX design in mobile applications.	100	3	5	3.89	.751	0.121
I believe that staying abreast of emerging trends and technologies in the field of mobile UX design is important for continuously improving and innovating mobile app experiences.	100	3	5	4.22	.675	0.603
<b>The effective strategies for optimizing UX design in mobile applications</b>	100	3.00	4.60	4.0680	.36979	
<b>Valid N (listwise)</b>	100					

**Table 8: Frequency & Percent of the effective strategies for optimizing UX design in mobile applications**

S	Strongly disagree		not agree		Neutral		Agree		Strongly Agree	
	F	%	F	%	F	%	F	%	F	%
I believe that incorporating user feedback early in the design process is essential for optimizing UX design in mobile applications.	-	-	-	-	40	40%	33	33%	27	27%
I believe that conducting thorough usability testing is an effective strategy for identifying and addressing usability issues in mobile app designs.	-	-	-	-	17	17%	51	51%	32	32%
I believe that adhering to established UX design principles, such as simplicity and consistency, leads to improved user experiences in mobile applications.	-	-	2	2%	20	20%	33	33%	45	45%
I believe that fostering collaboration and communication among cross-functional teams is essential for successful UX design in mobile applications.	-	-	-	-	34	34%	43	43%	23	23%
I believe that staying abreast of emerging trends and technologies in the field of mobile UX design is important for continuously improving and innovating mobile app experiences	-	-	-	-	14	14%	50	50%	36	36%

#### 4. The impact of UX design on user satisfaction, engagement, and retention

- ✓ Statement “I believe that a well-designed UX positively impacts user retention with mobile applications” came in the first place with an arithmetic mean of 4.37 and a standard deviation of .747. Therefore, the direction of the responses of the study sample is Agree.

- ✓ Statement “**I believe that addressing usability issues and improving the overall UX leads to higher levels of user satisfaction with mobile applications**” came in the second order, with a mean of 4.07 and a standard deviation of 1.112. Therefore, the direction of the responses of the study sample is Agree.
- ✓ Statement “**I believe that optimizing performance and reducing loading times contributes to higher user satisfaction and engagement with mobile applications**” came in the third order, with an arithmetic mean of 4.03 and a standard deviation of .784. Therefore, the direction of the responses of the study sample is Agree.
- ✓ Statement “**I believe that an intuitive and user-friendly UX design increases user engagement with mobile applications**” in the fourth rank came with an arithmetic mean of 3.84 and a standard deviation of .368. Therefore, the direction of the responses of the study sample is neutral.

According to the data presented in the table, the impact of UX design on user satisfaction, engagement, and retention include its simplicity for users to use, addressing usability issues and improving the overall UX leads to higher levels of user satisfaction, optimizing performance and reducing loading times contributes to higher user satisfaction and engagement, and a well-designed UX positively impacts user retention with mobile applications.

**Table 9: Descriptive Statistics of the impact of UX design on user satisfaction, engagement, and retention**

Descriptive Statistics						p-value
	N	Minimum	Maximum	Mean	Std. Deviation	
I believe that an intuitive and user-friendly UX design increases user engagement with mobile applications.	100	3	4	3.84	.368	0.344
I believe that addressing usability issues and improving the overall UX leads to higher levels of user satisfaction with mobile applications.	100	1	5	4.07	1.112	-
I believe that optimizing performance and reducing loading times contributes to higher user satisfaction and engagement with mobile applications.	100	3	5	4.03	.784	0.314
I believe that a well-designed UX positively impacts user retention with mobile applications.	100	3	5	4.37	.747	0.013
<b>Valid N (listwise)</b>	100			4.07	0.443	



**Table 10: Frequency & Percent of the impact of UX design on user satisfaction, engagement, and retention**

S	Strongly disagree		not agree		Neutral		Agree		Strongly Agree	
	F	%	F	%	F	%	F	%	F	%
I believe that an intuitive and user-friendly UX design increases user engagement with mobile applications.	-	-	-	-	16	16%	84	84%	-	-
I believe that addressing usability issues and improving the overall UX leads to higher levels of user satisfaction with mobile applications.	3	3%	7	7%	19	19%	22	22%	49	49%
I believe that optimizing performance and reducing loading times contributes to higher user satisfaction and engagement with mobile applications.	-	-	-	-	29	29%	39	39%	32	32%
I believe that a well-designed UX positively impacts user satisfaction with mobile applications.	-	-	-	-	16	16%	31	31%	53	53%

## Conclusion

This study has shed light on the multifaceted nature of UX design challenges, strategies, and impacts in the mobile app domain. It has revealed the complexities involved in creating intuitive, efficient, and enjoyable user experiences that resonate with diverse user demographics and usage contexts.

The findings of this research have practical implications for UX designers, developers, businesses, and users alike. UX designers and developers can leverage the identified challenges and effective strategies to optimize their design processes and create mobile applications that meet user needs and expectations effectively. Businesses can capitalize on the correlation between superior UX design and key performance indicators such as user satisfaction, engagement, and retention to gain a competitive edge in the marketplace and drive business success.

Moreover, this research has contributed to the academic discourse by advancing our understanding of UX design principles, methodologies, and impacts in the context of mobile applications. By disseminating these findings and insights, scholars and researchers can stimulate further inquiry, innovation, and collaboration in the field of UX design and mobile technology.

Looking ahead, the field of UX design in mobile applications is poised for continued growth and evolution. As technology advances and user expectations evolve, new challenges and opportunities will emerge, necessitating ongoing research, experimentation, and adaptation. By staying abreast of emerging trends, embracing innovative approaches, and prioritizing user-centric design principles, stakeholders in the mobile app ecosystem can continue to create transformative experiences that enrich and empower users' lives in the digital age.

## Recommendations

Here are some recommendations for improving UX design in mobile applications:

- Utilize feedback loops to iteratively refine the UX design and address user needs effectively.
- Ensure that mobile applications are intuitive, easy to navigate, and visually appealing.
- Minimize loading times, reduce app crashes, and optimize resource usage to enhance user satisfaction and engagement.
- Ensure inclusivity by integrating accessibility features into mobile applications.
- Conduct accessibility audits and testing to identify and address potential barriers to accessibility.

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