

# **Title: Impact of progressive Web Apps on Web App Development**

Name: Moinul Islam, ID:20-42390-1, Section: B

## **Motivation:**

My domain is Progressive Web Apps. When I grew up I discovered that my interest field is on web-based apps (Web Application) that can load even without an internet connection or it can be offline so we can continue our work. So, for that, now I want to research in progressive web apps field. Recently I saw an article where a company like Alibaba is working on progressive web apps (PWA) strategy. On that topic, I searched about it on google search engine. After a few days I discovered some interesting information about it. For example, In the website app-like interfaces that work without any internet connection or offline. The website content looks like a native app with the ability to work offline or low-quality networks due to these progressive web apps. PWA's allow webpages to become apps more and less like other webpages. In future, I hope it will be more useful and effectful for users. For this, I like this type of domain.

## **Research Proposal:**

### **Introduction:**

The name of my research topic is Impact of Progressive Web Apps on Web App Development. It is very important to work in this field. Because of Progressive Web Apps now the development of web apps using an offline-first strategy is possible. Progressive Web Apps offer users a web-based user experience that is reliable, fast and engaging [1]. It loads faster, it could be a website that looks as well as functions similar to a normal app does and also it can be as fast as an apps. People said that the progress of web apps was so fast before but in recent times it is not developing so fast [2]. People frequently told that Web Apps is not developing as well as expected. Right now, less amount of people talking about PWA (Progressive Web Apps). But people really want to development.

There has been a paradigm shift from browser to native apps and back to browser in recent years [3]. When the internet connection is lost PWA's offline mode feature helps users to view specific pages. As a result, all the procedures will stay constant. PWAs are web applications that use web technologies and execute in a browser, but they are seasoned with methods that let them function like native apps on mobile phones. [4]. Progressive Web Apps, a new technology under development, hope this will ease our task. PWAs are always being improved in consideration of their huge development, so they will only become faster, more attractive, and more stable in the future [5]. Then users can get all of these features in future.

### **Literature Review:**

PWA has a lot of web features to work with. The impact of progressive web apps on web development is tremendous. PWAs will be used by eCommerce brands in 2022 to address a wide range of business and customer-related problems [6]. There are so many eCommerce brands right now they are working with PWAs so that they can engage more customers. After researching some research papers, some negative aspects of PWAs were found for web apps in the future. It might be resolved in the future. A PWA's limited functionality when it comes to accessing a device's hardware features is one of the major disadvantages [7]. However, this has been improving in recent years and it is expected to keep doing so. By developing new standards and implementing them in browsers, PWA is catching up to features that are enabled by default in native apps [8]. If PWA can be used to build the essential functions of an application, it can take the place of a native app.

According to research, users interact more with installed apps than they do with official websites [9]. A PWA gives consumers the appearance, feel, and level of interaction of a normal app. PWAs will be available for installation by Google Chrome OS users, considerably improving the environment of the operating system [10]. It will be much easier for users when they install it. According to Google, the use of PWAs has skyrocketed in the last year, with a 270% increase in PWA installation [11]. According to Windows Latest, it seems that Google is implementing a very helpful update to that process. Approximately 80% of app users prefer to move the app to the home screen [12]. Users of PWAs can choose to store the app on their home screen without having to deal with download. Progressive web apps are a type of cross-platform app that runs in a web browser and is designed to be lightweight in order to provide an amazing native-like experience [12]. Considering everything it is better for users because users of PWAs do not need to worry about installing, browsing, or using the app store.

Responsive web apps are a comprehensive approach to deliver a better customer experience on various devices. Responsive web apps are a comprehensive approach to improving the user experience across multiple devices. [13]. Responsive web design was the first natural step to make websites more helpful for mobile users when mobile devices first got popular. However, responsive web apps were unable to provide the extra features that users expected from their smartphones, such as offline access, push notifications, and other native app-like features. But some features like offline support, Push Notifications, Faster UI, Multiple Platform Support etc. are available in PWAs. Any sort of device can use responsive progressive web apps. It can be used with any type of device, including desktop, mobile, tablet, and upcoming devices.

### **Objectives:**

Main Objective: The objectives of this research are to find how progressive Web Apps will be impactful for users in future.

Sub objective 1: The objective is to investigate the usability of native app facilities.

Sub objective 2: The second objective is to investigate the capability of Progressive web application.

Sub objective 3: The third objective is to investigate usability of offline strategy in application.

### **Research Question:**

Main Research Question: What are the consequences fulfilling the impactful effect of web Apps criteria?

Sub Question 1: Does the web apps fulfill the usability of native app criteria?

Sub Question 2: Does the progressive Web application fulfill the capability of web apps criteria?

Sub question 3: Does the offline strategy in application fulfill the usability of web apps criteria?

### **Proposed Research Methodology:**

In this research paper, understanding both qualitative and quantitative points is necessary in order to respond to all of the research questions. Therefore, there must be space for a number of perspectives to be used in order to fulfill the many objectives that the research has set for itself. PWAs and Native apps have a similar impact on user experience, as well as the same speed, responsiveness, and comprehensive capabilities of websites with database access and automatic data also have a similar appearance to Native apps [14]. But if we see the Native apps, it is usability not that much impactful what PWAs have. PWAs features are more usable than native apps. Because due to the service worker update process it is always upgraded. Progressive web applications have surely made it simpler and more enjoyable for users to browse a standard website or an e-commerce site. PWAs (progressive web apps) combine the advantages of native apps and normal web apps (WebView is covered in the section below), as well as inevitably some of their weaknesses [15].

Progressive Web Apps almost fulfill the capability of web apps criteria. PWA is an app that offers users an experience more similar to an app by utilizing the features of the modern web [16]. JavaScript, CSS and HTML are web technologies used for Progressive Web Apps. Other apps can download sites from App store or google play stores and those are normally written in the programming language. But PWA can be accessed from any device's browser like Opera, Chrome, Brave etc. But it does not support some browsers like Safari, Internet Explorer, Edge etc. When compared to native apps, PWA apps take up less space and can be downloaded directly to a mobile device as an app icon [17]. And most importantly the application is simple to share via URL and does not need any installation. The next stage of a web app that can be installed and has the look and feel of a native app is a progressive web app [18].

When making offline strategies in applications that will help users in future. The finest feature for developing a Progressive Web App in cases of poor connectivity or no connectivity at all. The user can access the information for their most recent online interaction and the data is stored. Since the beginning of the laptop era, apps that work when "offline" or "disconnected" have been important [19]. The "offline-first" strategy is becoming more popular among developers, whereby an app is made to perform without a network connection, giving users the chance to sync their data, get updates, and more [20]. Many well-known applications, including Uber, Google Maps, and the Amazon Kindle, use the offline feature because of its advantages [21]. The cost to build an offline mode app relies on a variety of elements, including features, design complexity, the location of the development team, platforms used for development, testing, etc. [22]. So, we can say partially offline strategy in application fulfill the usability of web apps criteria.

Sub Question 1: Does the web apps fulfill the usability of native app criteria?

Method: "Formal Methodology" will be used because to justify this question I have to analyze Computer Programming .

Sub Question 2: Does the progressive Web application fulfill the capability of web apps criteria??

Method: "Formal Methodology" will be used because to justify this question I have to analyze Computer programming.

Sub Question 3: Does the offline strategy in application fulfill the usability of web apps criteria?

Method: "Build Methodology" will be used because to justify this question I have to analyze Complexity theory and Computer Programming.

## References:

- [1] P. Thakur, "Evaluation and Implementation of Progressive Web Application", bachelor's thesis, Helsinki Metropolia University of Applied Sciences, 2018.
- [2] J. Parsons, "What are progressive web Apps? ", The Official Ionic Blog, 2016.
- [3] T. Steiner, "An Analysis of Progressive Web App Features When the Means of Web Access is not a Web Browser", 2018.
- [4] R. Fransson and A. Driaguine, "Comparing Progressive Web Applications with Native Android Applications", bachelor's thesis, Linnaeus University, 2017.
- [5] J. Nguyen, "PWA Future: What's Coming To The E-Commerce World?", 2022.
- [6] S. Javed, "The future of PWA in 2022: What makes it promising", 2022.
- [7] A. Insignares, "PWA vs Native Apps: Pros and Cons", Koombea Magazine, 2021.
- [8] K. Arshuk-Popov and I. Stetsiuk, "Progressive Web Apps: Comparison of PWA with Other Approaches to Build Mobile User Experience", 2022.
- [9] H. Nyakundi, "What is a PWA? Progressive Web Apps for Beginners", 2021.
- [10] S. Birch and A. Russell, "Progressive web apps: Great experiences everywhere", USA, 2017, <https://www.youtube.com/watch?v=m-sCdS0sOO8>.
- [11] A. Myrick, "Google Chrome preps in-app tabs for Progressive Web Apps", 2022.
- [12] T. Nagar, "Progressive Web App development: An overview", 2020.
- [13] R. Shetty, "Progressive Web Apps And The Future Of Mobile Web", Blogs:10, 2021.
- [14] N. kvartalni, "BENEFITS OF PROGRESSIVE WEB APPS (PWA) – ADVANTAGES AND DISADVANTAGES", 2022.
- [15] J. Adam, "Web apps vs native apps: a comparison", Digital Transformation Blog, 2021.
- [16] Simplilearn, "Demystifying Progressive Web Apps: What They Are, How They Work, and Why They Matter", 2021.
- [17] H. Brains, "Understanding the Importance of Progressive Web Application Development", 2018.
- [18] Swing App, "Web App Vs Progressive Web App: Why Are They Different From Each Other?", 2022.
- [19] L. Whitney, "Offline Capabilities: Native Mobile Apps vs. Mobile Web Apps", 2012.
- [20] TechAhead Team, "Offline app architecture: Why you should build offline-first apps", 2020.
- [21] S. Srivastava, "Offline-first Apps: Why Your Mobile App Should Work In Offline Mode?", 2021.
- [22] M. Rajput, "The Ultimate Guide to Make Your App Available Offline", 2022.