

CHAPTER I

INTRODUCTORY

1.1 Background

From the derivative of mathematics and physics. As time goes on, Computer Science has become the greatest product of contemporary history. It led to massive advancement across the world. It's employed in every aspect of our life, from furthering education distribution, accelerating healthcare progress, expanding communication, predicting and avoiding catastrophes to empowering people in every area of society, including paving the way for a more equitable world. With all the advantages it brings, computer science is attracting enormous attention. According to CRA Taulbee Survey, the number of undergraduates mentioning a computer science major at Ph.D. in the US has grown 60% from 2011-2014 and the number of graduation has also increased by 34% from 2008-2013 (Cooper et al., 2016). One of the popular courses in computer science is software engineering that process to the design, creation, and maintenance of software for different purposes.

Software engineering can refer to desktop, web, or mobile development. With each restricted to its own platform, it is a hassle to develop independent apps for the respective platform, from time-consuming to device compatibility problems. But it all changes after Google introduced Progressive Web Apps since 2015, it is a new development approach that allows for websites to behave and have features that were previously found only in native apps. Features like working offline, receive push notifications and allow users to install the PWA sites to their devices' home screen. It is all made possible by adding both the service worker and manifest file to the website (Steiner, 2018).

Progressive Web Apps enable easy reusability of code across all platforms. For organizations or companies without the willing-ness or the resources to employ specialized developers for each specified platform, cross-platform become a popular alternative (Biørn-Hansen, Majchrzak, & Grønli, 2017). Now, multinational and national companies like Twitter, Trivago, Alibaba, Forbes and Sina Weibo have invested in PWA. AliExpress increased the conversion rate for new users by 104% with their revamped Progressive Web App, Twitter launched

Twitter Lite that significantly increased engagement and reduced data consumption by 70%. Even in a developed country, India with its largest eCommerce platform FlipKart, intending to reinvent its digital experience, transitioned to PWA. The company saw 3 times lower data usage, 3 times more time spent on the website, a 40% higher re-engagement rate, and a 70% greater conversion rate among those arriving via “Add to Homescreen” PWA feature.

With each transition to PWA, not just additions are required, some adjustments to the codebase are inevitable too. Therefore, code refactoring becomes a future proof technique to keep the code simpler, cleaner, reusable, extendable and maintainable to the everchanging PWA implementation. It involves the removal of unused code and classes, renaming methods and variables to more descriptive ones, and making use of a function to implement every single responsible functionality to deliver modular, reusable and service intended components (Sangeetha & Sangeetha, 2016). Hopefully, with the code refactoring and PWA techniques shown here can inspire more developers or serve as a reference for transitioning their own websites to Progressive Web Apps with clean code.

1.2 Scope

The thesis will be limited to the following scope:

1. The existing Forum Kerukunan Umat Beragama website will be refactored to fix bugs of both interface design and security.
2. Besides code refactoring, some adjustments and additions to the backend business logic are also implemented to improve the website.
3. The implementation of Progressive Web Apps concept for better accessibility. Such as offline functionality, content caching, installability, and much more.

1.3 Objectives

1. To improve the User Experience of Forum Kerukunan Umat Beragama Batam website by code refactoring.
2. To deliver native-like features by implementing the PWA approach to Forum Kerukunan Umat Bergama website.

3. To serve as an opportunity for us to implement lessons acquired from Universitas Internasional Batam to a real-life situation.
4. To achieve one of the requisites required to successfully graduate from Universitas Internasional Batam.

1.4 Output

The all-new Forum Kerukunan Umat Beragama website equipped with Google's Progressive Web Apps features and fully refactored to provide both better accessibility and user experience.

1.5 Benefits

With the detailed process of accessibility enhancement through Code Refactoring and Progressive Web Apps implementation, it will serve as the reference for future software developers that are willing to implement the Progressive Web App approach on their newly developed or existing websites.

For the writers, this thesis project will provide the chance to make use of the related skills obtained from Universitas Internasional Batam.

1.6 Systematic Discussion

CHAPTER I: INTRODUCTORY

The writers will be elaborating the background that leads to the making of this mini-thesis, from computer science with software engineering field which along the existence of Progressive Web Apps and some refactoring can make cross-platform deployment more affordable; after that continue to the scope, objectives benefits and output of this mini-thesis.

CHAPTER II: LITERATURE REVIEW

This chapter cites various journals and theories that are related to code refactoring and Progressive Web Apps as references.

CHAPTER III: RESEARCH METHODS

This chapter includes the methods used for developing the Forum Kerukunan Umat Beragama website into the PWA site.

CHAPTER IV: IMPLEMENTATION AND DISCUSSION

Chapter VI contains the implementation of the refactored version Forum Kerukunan Umat Beragama site. And also the result comparison of before and after the process of refactoring.

CHAPTER V: CONCLUSION

In this chapter; the writers will get to the conclusion after implementing all discussed technologies that have been revealed in this mini-thesis report. Along with the path of research that can likely be pursued in the future.