



Faculty of Computer Science and Information Technology

Better In My Tummy: A Mobile App to Prevent Food Waste

NUR HUSNINA BINTI KHALIK

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ABSTRAK

Makanan adalah keperluan asas bagi manusia. Tanpanya, orang ramai tidak akan dapat nutrien yang mereka perlukan. Walaupun dengan keperluan ini, terdapat sejumlah besar makanan yang sentiasa dapat ditemui di dalam tong sampah yang mengisi dengan penuh lori sampah dan tapak pelupusan sampah. Tanpa disedari, ini telah menyebabkan pengeluaran pelepasan gas hijau di seluruh dunia. Sisa makanan adalah masalah yang dikenali penduduk masyarakat pada zaman sekarang dan UNIMAS tidak terkecuali. Projek ini bertujuan untuk mengurangkan jumlah sisa makanan dalam kawasan UNIMAS dengan membenarkan peniaga makanan menjual lebihan makanan yang tidak dapat dijual tepat pada masanya kepada pelajar di sekitar kampus. Dengan Better In My Tummy, penjual makanan mampu menjual lebihan makanan yang tidak terjual pada harga diskaun dengan harapan dapat memastikan makanan dimakan dan tidak dibuang. Ciri gamifikasi yang terdapat pada aplikasi ini yang membolehkan pelajar untuk mengumpul lencana akan menggalakkan pelajar untuk menggunakan aplikasi ini dengan tujuan untuk mengurangkan dan mencegah pembaziran makanan.

ABSTRACT

Food is fuel for the human being and always has been. Without it, people will not be able to get the nutrients they need. Despite the necessity of food, there is always a huge amount of food found in rubbish bins, filling up garbage trucks and landfills. Without realising, this has caused the production of green gas emissions around the globe. Food waste is a known problem in today's day and age and UNIMAS is not excluded. This project is aimed to reduce the amount of food waste in UNIMAS by allowing food vendors to sell the surplus food that was not able to be sold in time to students around campus. With Better In My Tummy, food vendors are able to sell unsold surplus food at a discount price in hopes to ensure that food is eaten and not discarded. Hence the name of the application, Better In My Tummy. The application's gamification feature of collecting badges will encourage students to further engage in the application with the intention of reducing and preventing food waste.

CHAPTER 1: INTRODUCTION

1.1 Introduction

Food waste refers to food that is discarded, left to spoil, or caused by bad shopping habits and oversupply from producers. Not only it is not a great feeling when food is thrown out, this has always been an issue across the globe. Among the reasons for this crisis to occur comes down to the preparation by F&B companies that tend to produce more than what is being sold. The oversupply of food and individuals with a habit of overspending ends up with uneaten goods leading to wastage. With this in mind, a solution to prevent food wastage is vital to see change in the amount of food wastage that is produced.

Giving highlights to life on the University campus, students are always on edge about their spending habits especially when it comes to the necessity in feeding themselves. It is always a plus for students to spend as little as possible to get by when living on campus. Meanwhile, food vendors provide affordable hot meals on a daily basis for consumption and provided that food vendors supply more than necessary, there is always food that is not consumed. With Better In My Tummy there is less food wastage, it is cost-effective and practical for students and food vendors all around.

1.2 Problem Statement

Food is wasted globally day by day filling up the garbage trucks and landfills. Not to mention, prices of many items including food prices has significantly increased after the Covid pandemic and inflation crisis. This is clearly a worry to most people. To make matters worse, food that is wasted generates greenhouse gas emissions which affect our environment. In order to slow climate change and reduce waste overall, each individual serves a purpose in preventing it from happening.

Food waste is caused by over-preparation of food and purchasing too much food. This is not a good habit for both consumers and producers. Thus, Better In My Tummy is equipped to help make a difference with a small change focusing on the University campus area. Fresh food should not go to waste simply because it is not sold in time or when a restaurant has reached the closing hours. Rather than leaving food to go to waste and causing a loss to food vendors, small profits can easily be made.

1.3 Scope

This proposed project is targeted towards students and food vendors in UNIMAS. A mobile application is proposed to be used for students to purchase limited food items that are sold for an affordable price by food vendors in UNIMAS which were initially intended to be discarded or thrown away. The application will only be available for Android operating system platform users.

1.4 Aim and Objectives

The aim of Better In My Tummy is to develop a mobile platform food purchasing system to be used by students and food vendors in UNIMAS. The project objectives are stated below:

- 1.To analyse the advantage of Better In My Tummy among students and food vendors in UNIMAS.
- 2.To develop a mobile application that encourages the prevention of food waste.
- 3.To assess the usability and functionality of the purchasing action in the mobile application.

1.5 Brief Methodology

The methodology for this project is based on the Mobile Application Development Life Cycle (MADLC).

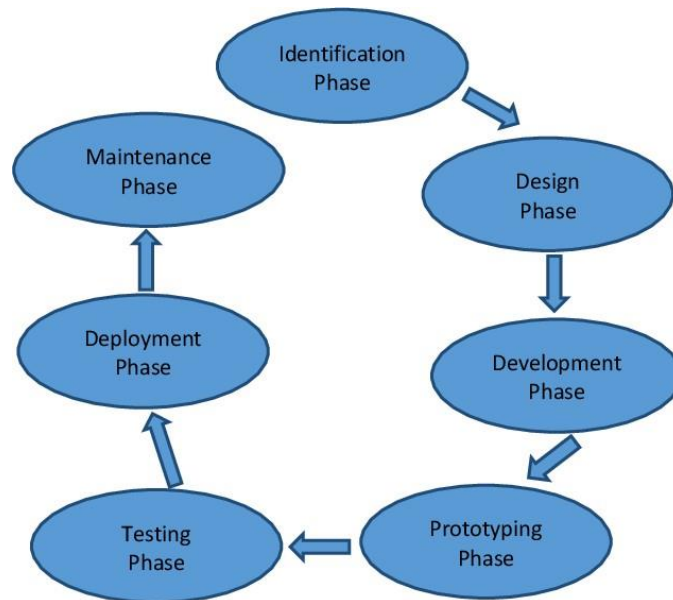


Figure 0.1 Mobile Application Development Lifecycle (MADLC) Model Source: (Vithani & Kumar, 2014)

Based on Figure 1.5.1, the first phase is identification where ideas are collected to proceed with the project design. The design phase includes designing the mobile application according to the ideas collected in the identification phase. Third, the application is developed during the development phase. Then, the prototyping phase will determine or validate the ideas or functionality of the product. The testing phase will decide on the quality of the product and whether or not the product can be deployed. Once deployed, maintenance is required for product efficiency.

1.6 Significance of Project

Despite having multiple food purchasing applications on the market such as Grab and FoodPanda, this proposed application is highly beneficial for food vendors and also students. This mobile application focuses more on food waste and how to overcome the problem. Students will have the perks of using this application. This includes the food prices which it is a lot cheaper than the usual normal price while at the same time helping the planet. Food vendors will inevitably avoid the act of allowing food to be thrown out while at the same time contributing to the preservation of the environment.

1.7 Project Schedule

The project is scheduled to be completed within two semesters or one year long. The duration of the project is illustrated using a Gantt Chart in Appendix A.

1.8 Expected Outcome

The expected outcome would be a developed mobile application that can be used by students in UNIMAS to buy food at a lower cost while helping prevent good food from going to waste. In condition that the project receives positive feedback, there are hopes to see more people encouraged in preventing food waste.

CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

This chapter includes an analysis of existing mobile applications with the proposed mobile application. Four different food waste mobile applications are evaluated to determine their advantages and disadvantages.

2.2 Review on Existing Applications

There are plenty of food waste mobile applications available to download. This chapter introduces the existing applications and the comparison of a number of them. There are four existing mobile applications that will be reviewed and compared and below are listed the names of the mobile applications.

1. **Too Good To Go** (David, 2022)
2. **Karma** (Elsa Bernadotte, Mattis Larsson, Hjalmar Nordegren, Ludvig Berling, and Steven vanWel, 2015)
3. **ResQ Club** (Tuure Parkkinen, 2015)
4. **OLIO** (Tessa Clarke and Saasha Celestial-One, 2015)

2.3 Too Good To Go

Too Good To Go is a mobile application-based service connecting customers with restaurants and stores with unsold food. The company was created in 2015 in Denmark by Brian Christensen, Thomas Bjørn Momsen, Stian Olesen, Klaus Bagge Pedersen, and Adam Sigbrand (ZWE, 2020). Too Good To Go's mission is to reduce food waste worldwide. The company created a mobile application that connects restaurants and stores with unsold, surplus food with customers who can buy food that an outlet considers surplus at a much lower price than normal (Fisk, 2020).

The food on the application is one-third the original price. According to the company, this reduces food waste that would otherwise be discarded. These outlets or restaurants are required to inform the company of their daily options, including the types of food they have as well as the cost of a "magic bag" whose contents the user cannot choose, but the original prices will be at least three times the discount price.

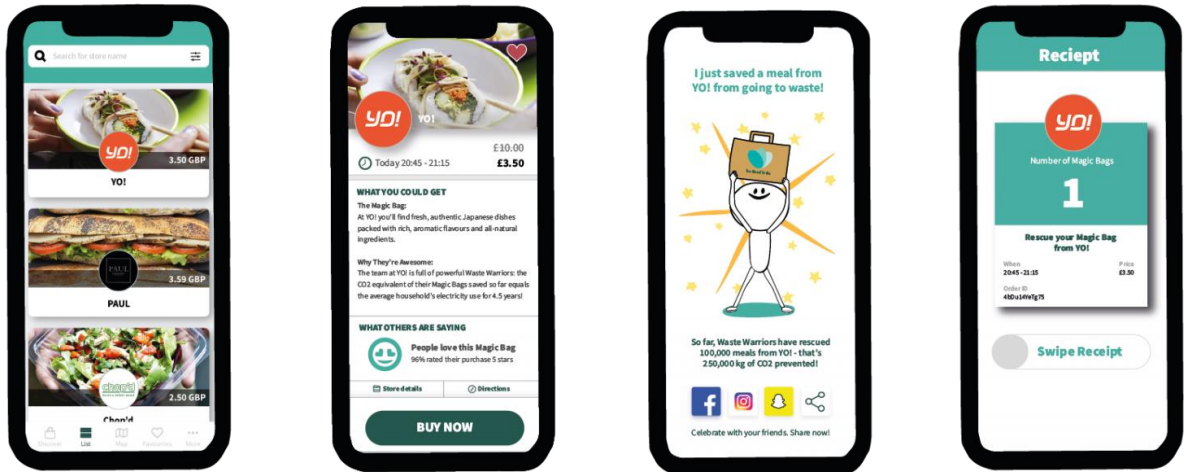


Figure 2.1 Too Good To Go Mobile Application (David, 2022)

The figure above shows the interface of the mobile application and a summary of the features and disadvantages is listed below. The main disadvantage of the Too Good To Go mobile application is the lack of insight into what is to be received by the buyer.

Features:

1. Magic Bag as the surprise aspect similar to receiving a gift
2. User is able to view the ratings of a magic bag
3. Easy transaction

Disadvantage:

1. Unspecified content of the magic bag
2. Items are sold fast

3. Fewer options
4. Last-minute cancellation

2.4 Karma

Karma, founded in 2015 aims to assist restaurants and cafés in reducing food waste. Instead of throwing away excess food, they can sell it through Karma. With Karma, the user does not have to worry about having food go to waste (Karma - Save Food with a Tap, 2021). Customers order food directly from the application as take-out and receive high-quality food for a lower price. Karma highly values choice over savings.

The application allows the user to buy specific food items that are going to waste and pay roughly half the price at specific times. The mobile application is free to download, and payment for the products is made through the application before picking orders up at the store.



Figure 2.2 Karma Mobile Application (Thomas, 2018)

Figure 2.4.1 above shows the interface of Karma. A list of the features and disadvantages is displayed below. As a conclusion, the main disadvantage of the Karma mobile application is the lack of wide range hence less people would be able to use the application.

Features:

1. Loyalty system where the user gets rewarded for frequent usage
2. Users can earn badges

Disadvantage:

1. The downside of Karma is that it lacks a wide range location-wise
2. Users have limited choices when living outside the main city

2.5 ResQ Club

ResQ Club is a Finnish company founded in 2015 that connects consumers who value eating wholesome, reasonably priced food with environmentally friendly cafes, restaurants, and grocery stores. Unlike food delivery applications, there's no waiting involved – ResQ orders are ready for pickup immediately after your order (ResQ Club, 2019). With the location-based mobile, ResQ Club enables customers to locate and rescue excess food in their respective areas. One can choose a suitable offer consisting of meals, ready-to-eat snacks and grocery bags that are 50% discount. Besides that, the users of ResQ Club mobile application may purchase more than one offer.

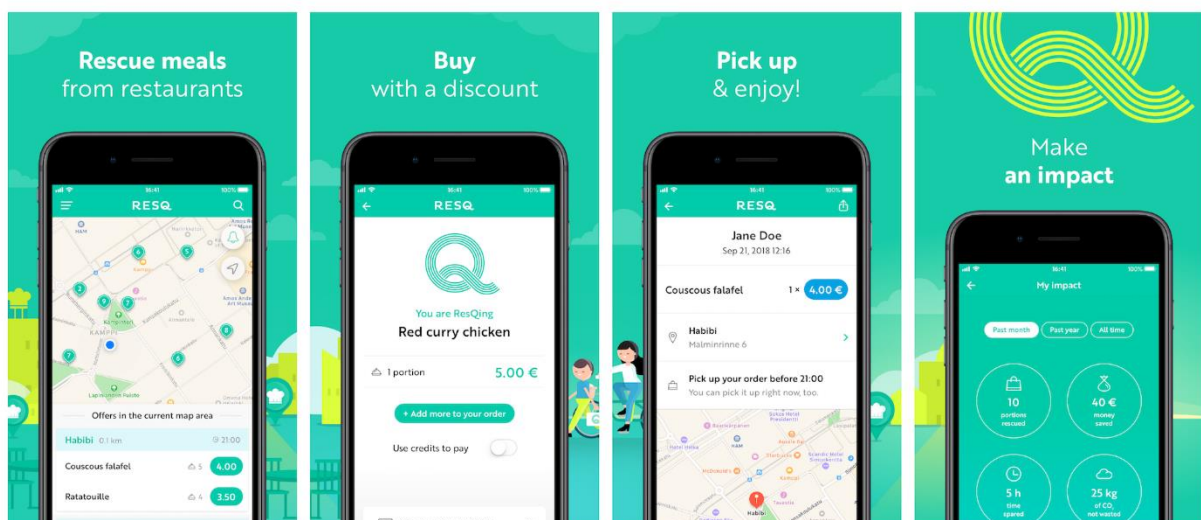


Figure 2.3 ResQ Club Mobile Application (SYKE, 2019)

The figure above is an example of what the interface of ResQ Club application looks like. There are a number of features and also disadvantages found while using the mobile application listed below.

Features:

1. Orders are ready for immediate pickup
2. A certificate is given to partners that receive good reviews
3. ResQ credits as a payment method

Disadvantage:

1. No cash payment
2. Limited offers

2.6 OLIO

OLIO was founded in 2015 and links neighbours and local stores with one another with the aim that extra food can be shared rather than wasted. On OLIO, one can find millions of people giving away food & other household items to their neighbours, all for free (OLIO, 2022). The food mentioned can vary from nearby stores that are about to expire, extra vegetables from one's garden, bread from the bakery or the food in the refrigerator.

Besides being free and no purchase transactions are needed, OLIO can also be applied to household goods that are not food-related for the convenience of the users. The user only needs to take a picture of an item to be placed in the application. Once uploaded, other users of the application can request to take the item at an agreed pickup location.

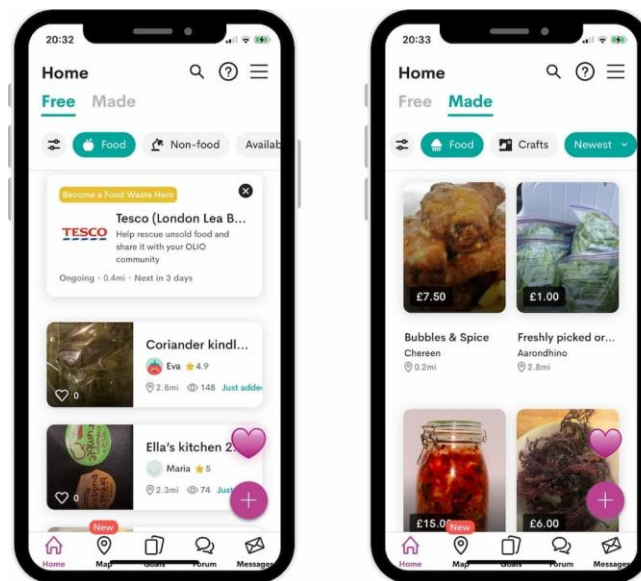


Figure 2.4 OLIO Mobile Application (GOODALL, 2021)

Figure 2.6.1 is what to expect when using the OLIO mobile. The features and disadvantages are also listed below. To summarise, many users have encountered late notifications and glitchy interfaces.

Features:

1. Badges, Levels and Points are earned by users
2. Free donations

Disadvantage:

1. Glitchy and slow in receiving notifications
2. No review system
3. Pay to see listings
4. Charges larger businesses to list on the application
5. Need of paying for extra features with a subscription

2.7 Comparison of Existing Applications and the Proposed Application

The table below displays the comparison of the existing applications.

Table 2.1 Comparison of Existing Applications

Comparison	Too Good To Go	Karma	ResQ Club	OLIO	Proposed Mobile Application
Availability	17 Countries	Sweden and London	Finland, Germany, Sweden, and Poland	Worldwide	Universiti Malaysia Sarawak
Collect Method	Collect meals at the store	Collect meals at the store	Collect meals at the store	Collect free items at the meet-up location	Students are to collect orders and

					free meals at the stall
Gamification	Magic bag	Badges	ResQ credits, Certificate	Badges, Levels and Points	Badges and Layout of Student Pavilion
Payment Method	Bank Card, Google Pay or PayPal	Bank Card	ResQ credits, Bank Card, Online Payment, PayPal, Apple Pay, Google Pay	-	Cash or S Pay Global
Download Cost	Free	Free	Free	Free	Free
User Authentication	Password	Password	Password	Password	Password
Platform	Android and iOS	Android and iOS	Android and iOS	Android and iOS	Android
Registration	Using Google, Facebook or Email	Email or Facebook	Using Google, Facebook or Email	Email or Facebook	Email