

**GIGVERSE: AN ONLINE GIG ECONOMY  
PLATFORM FOR UMS STUDENTS**

**LIEW ZHENG HAO**

**FACULTY OF COMPUTING AND INFORMATICS  
UNIVERSITY MALAYSIA SABAH  
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**NAME** : LIEW ZHENG HAO  
**MATRIC NUMBER** : BI19110215  
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**APPROVED BY;**

1. **SUPERVISOR**

Dr.Chin Pei Yee

Signature

  
DR CHIN PEI YEE  
Senior Lecturer  
Faculty of Computing and Informatics  
Universiti Malaysia Sabah  
(DATE: 28 Feb 2023)

## **DECLARATION**

I hereby declare that the material in this thesis is my own except for quotations, equations, summaries and references, which have been duly acknowledged.

28 February 2022



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LIEW ZHENG HAO  
BI19110215

## **ABSTRACT**

Gig economy is identified as a new source of economic growth and would be made part of the 12th Malaysia Plan in the recent news. While this is going to better help independent workers to make their way in the gig economy, students should also be able to gain benefit from the emerging gig economy. It is becoming more of an issue that university students need to work while studying to cover the fund needed to complete their studies. Gig economy platforms in Malaysia are currently focussing more on skilled workers instead of unskilled and inexperienced parties such as university students. To better allow students in Universiti Malaysia Sabah (UMS) to be involved in the gig economy, this project is going to design and develop a gig economy platform exclusively for UMS students. The system authentication would only be limited to student mails to ensure no outsider into the platform. With applying predictive analytics, the system is going to make smart predictions of jobs towards its users and this will allow students to choose from various options. The application would allow students to demand and accept job offers from another student. It is expected that this project is going to help students with getting extra money from quick jobs and at the same time enjoy services created by the student community which are at a lower price.

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# **FINAL YEAR PROJECT**

## **PROPOSAL**

### **1.0 Introduction**

Gig economy is something that is seen more and more often throughout these few years. The term “gig economy” was coined by English journalist/author Tina Brown in 2009 in the aftermath of the global economic recession to describe a work-world dominated by free-floating projects, consultancies and part-time bits. (The star, 2021).

Goes into Malaysia context too fast, add global context

There are a lot of platforms that are offering gig jobs for Malaysians, some examples are freelancer.com, thekeda.com, rtist.com.my. While offering flexibility for its talents’ working hours, gig economy also gives reasonably good and instant money. However, all of these existing solutions have a common weakness to it, it is not customized for students who are in their studies to get started easily as there will be skills gap between them and the skilled workers. Students might also find the jobs offered in these systems still requires too much time and consistent commitment, which is an issue because not all students are able to free up enough time from their studies for side income.

Talk about mode of work that students are looking forward to have  
That would be fitting in the requirements of students and allow side income to happen

Therefore, this project aims to create a gig economy platform that would allow university students to offer quick and easy gig jobs, such as tutoring, mentoring, printing, cooking, pet care, product/software tester and many more, to other university students that are in the same or nearby areas. The platform would be created to be a mobile application that is named by “Gigverse” and it will be cross-platform for both Android and iOS users. Creating this new ecosystem in university campuses can help students to get quality, convenient and cheaper services. The many scopes and sectors of jobs allow students to choose from, some jobs can even potentially allow university students to gain some practical experience for their career expertise.

## **2.0 Problem Background**

With the blooming industry of technology, online platforms have been readily and easily accessible anywhere and anytime by anyone, giving rise to the number of workers in the gig economy (Paul Hype Page, 2020). For people with disabilities and the B40 (bottom 40% income group), the gig economy has provided access to fair, sustainable and productive means of earning a living with low barriers to entry. Hence, policies on the gig economy should factor in the preferences of such workers (Rahim *et al.*, 2021).

As mentioned in the introduction, an emerging issue about gig economy is how students might find it hard to take up jobs from the existing platform due to the skill gaps. Currently, there is not a gig economy platform in Malaysia that is only open for students and offer gig jobs that is suitable for students' free time and at their convenience. It is something needed as this is going to help students to overcome the tight competition with skilled gig workers, eventually exposed them to gig economy the right way, enable them to be benefited from the gig economy.

A survey report from Upwork shown that in 2020, 59% of Gen Z are freelancing part-time, while 64% of the respondents see freelancing as a temporary way of making money. As of the year 2020, according to World Bank, 26% of Malaysians are gig workers, that is approximately 4 million Malaysians are working in the gig economy. In the next five years, the gig workers are estimated to be 40 percent of Malaysia's workforces and will contribute 26 percent to economic growth (Jaafar, 2020). These data show the potential of gig economy becoming a norm for people no matter they are students, fresh graduates or skilled workers.

To bring it back to the root cause, the main reason Malaysian students are interested to participate in the gig economy is due to insufficient financial support. According to a report from HSBC in 2018, on a global scale, 84% of the university students are working while studying, in Malaysia, 9 out of 10 university students are working during their studies, and the reason is that they needed extra money to fund their studies. A gig economy platform that is able to provide suitable and convenient jobs for students to make easy money is what is needed.

### **3.0 Literature Review**

#### *Gig economy overview*

Gig economy refers to temporary and flexible jobs offered by companies or anyone who needs related services, gig economy involves independent workers instead of full-time employees. It is referred to as “crowdsourcing”, the “sharing economy” and the “collaborative economy” (Stewart & Stanford, 2017). Gig economy is getting popular across the globe throughout these years, all contributed by the mode of jobs which are remote, free to choose the type of job, quick and good money and also the advancement of technology that enables virtual working with efficiency. In Malaysia, under the recently unveiled 12th Malaysia Plan 2021-2025 (12MP), the government has assured that it will create an ecosystem that supports the development of the gig economy to encourage the people to take full advantage of this opportunity (The Star, 2021).

Gig economy has benefited a lot of people including skilled independent workers, full time workers that wish to get some side income and even to students that are currently in their studies. According to TechnoJobs, an IT job site based in UK, in an ever-competitive marketplace, it is getting harder than ever for young people to stand out and secure valuable opportunities for work placements, internships and even apprenticeships. Hence, gig economy has presented a perfect opportunity for youth that are studying to get practical experiences and beautify their resume to help them secure better jobs in the future. It is not just about getting practical experience, in Malaysia, 9 out of 10 students are working temporarily while studying in order to get enough funds to support their studies.

However, that is not always the case for most of the students. Current gig economy in Malaysia does not actually allow students to make the most out of it. Reasons being, firstly, the tight competition between students and skilled workers. Students often find themselves not chosen, if not, are not capable of the jobs available on current existing gig economy platforms. Secondly, most of the gig jobs in Malaysia nowadays still take up pretty much time off students, causing them to sacrifice their study time. In the long run, this could result in having low quality graduates.

### *About this project*

This project's goal is to solve this issue that no current existing gig economy platforms can solve, which is to develop a gig economy environment exclusively for students to demand and accept job offers. The system is going to be developed into a mobile application that is available on both Android and iOS, allowing every student that has a device to be involved. The name of the application is going to be "Gigverse".

1 of the key features of the application is that we would work together with university administration to provide credibility to the application. Once it is achieved, students are allowed to create an account in the platform using their student mail, and verification of students will be implemented to make sure there are only students in this gig economy platform. This could also help give confidence towards the students about the security of the platform.

Second key feature is using predictive analytics to predict what jobs a student wants. It can be hard to choose from a large pile of gig jobs available, hence, the platform is equipped with these skills. Data collection would begin with a quick survey during their signup, to obtain information on student's interested areas, preferred location, preferred benefits from the jobs and price range. Throughout the usage of the application, user behaviour is also recorded by the analytics tool, these data will then be analysed and make smart predictions for students on the job browsing module.

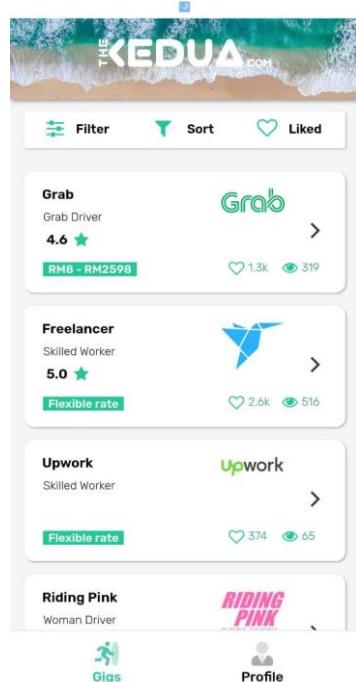
### *Review on current existing application*

\_\_\_\_\_The first application to be reviewed is TheKedua, it is a mobile application created by The BSV Group Sdn Bhd since 2017. TheKedua is considered the closest platform to this project in terms of its target user demographic, which is youth that includes both those who have finished studies or still in studies. The application review is as table below.

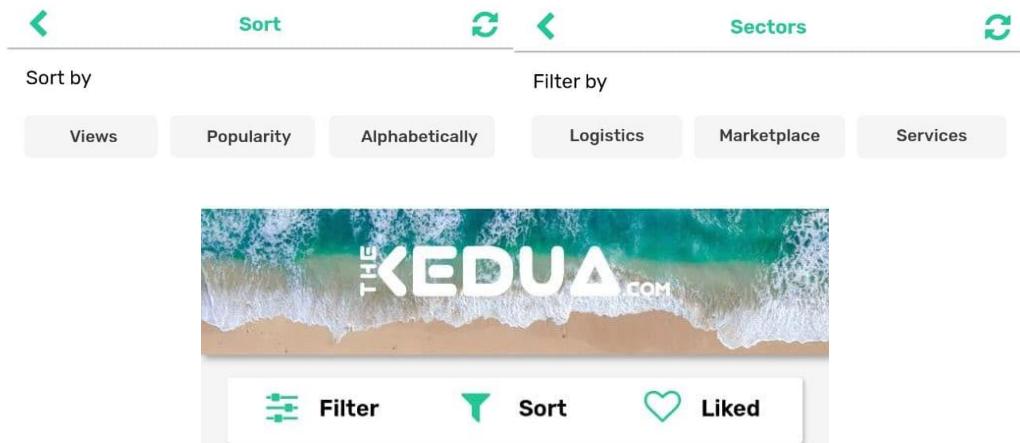
**Table 3.1: Application Review on TheKedua**

<b>Aspect</b>	<b>Evaluation [Tested on Huawei Nova 2i]</b>
Stability and Reliability	<p>The application uses somewhat a in-app browser that would collapsed under condition where it is not connected to internet.</p> <p>Battery consumption was relatively low, running the application for around 10 minutes would consume 1% of battery</p>
Consistency of the Platform	<p>In terms of UI and UX, the application done a good job with no potential abusive bugs. Users are able to scroll through items that are loaded, and that's it. There is also a loading icon everytime the app is trying to load more jobs on the dashboard.</p>
Loading Speed	<p>The application took around 3 secs to open, and a total 5-7 secs to load the user into the main page.</p> <p>Everytime user clicks on any of the jobs, it would take around 3 secs to load into it as well.</p>
UI hangups	<p>The only UI hangups in the application was the one mentioned above. Even when connected back to the internet, the application is no longer responsive and needs to be restarted.</p>
Presence of Advertisement	<p>There is averagely an ad for every 4 jobs listed out. The ads categories are: student related scholarships, TheKedua technologies ads to offer software development service, advertisement spaces for other companies</p>
Users are valuable customer	<p>The application is considered to be customer centric, this is shown from how the jobs was listed, it has a rating coming from previous users that tried before, a pay wage range to help user choose, also presented the number of views to this particular job</p>
Worthy functionalities	<ul style="list-style-type: none"> <li>- The application included filtering and sorting feature to help user find their jobs faster</li> <li>- A "Like" feature to help keep wishlist</li> <li>- An app walkthrough for new users</li> <li>- User profile settings are achieve easily</li> </ul>

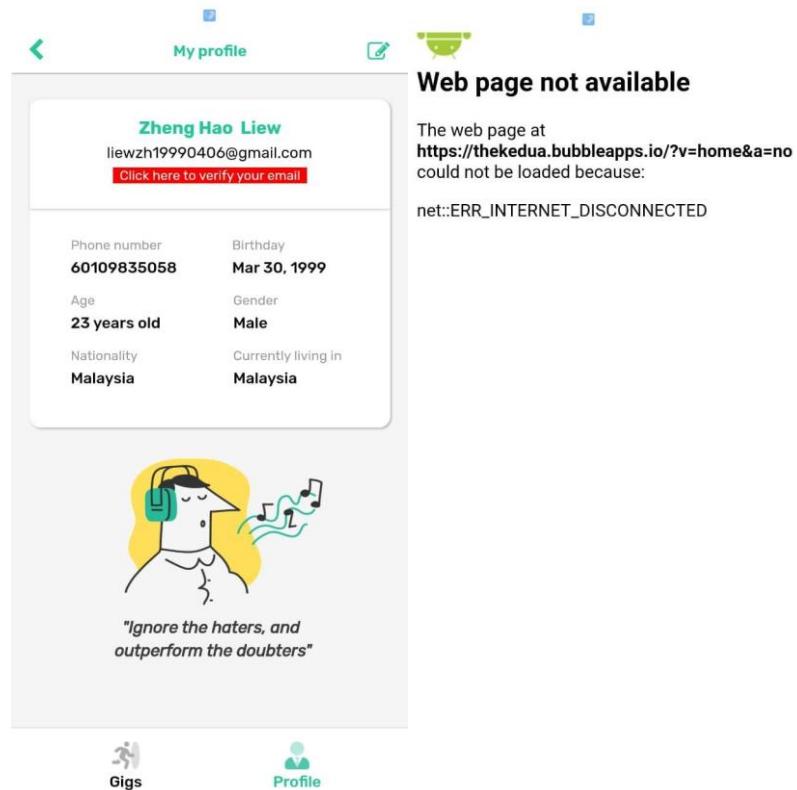
**Figure 3.1: Homepage of TheKedua**



**Figure 3.2: Filtering, Sorting and Like features**



**Figure 3.3: Weakness of TheKedua Application**



Overall, TheKedua application has some relation to the application we are building, only we have a few threats and weaknesses. To talk about the main functionality, TheKedua does not seem to fulfill its mission of offering jobs to its users. The app is more like a directory of available platforms for users to discover and make extra income out of it. The reviewing, ratings and price range does help users in choosing how they want to earn money but at the end of day, it is not an app where direct job offering and accepting is happening. The profile of the user in this application is considered simple and not much to present, to relate it to the app we are building, user profile should be filled with more information such as institution, interested areas, job experience, personal rating, short description, these can better help other users to identify the efficiency, past experience and help users to choose the right person to take the job.

The next application to review is FastGig, previously known as FastJobs, this is a gig platform that is based in Singapore. After launching and registering, the app will show the jobs that are nearby to the user. Job examples are cashier, store associate, warehouse packer etc.

**Table 3.2: Application Review on FastGigs**

<b>Aspect</b>	<b>Evaluation [Tested on Huawei Nova 2i]</b>
Stability and Reliability	When internet connection is cut off, the app did not crash, it went into blank mode for any page that it was trying to load. No loading icon was observed. However, there is a back button in almost every page on the app, making it possible to refresh the page by clicking back and enter the intended page again, the loading page will load with this refresh when the internet connection is back
Consistency of the Platform	In terms of UI and UX, the app has a small flaw in its page which is, for every dashboard the user clicks in, there will be a loading icon appearing for around 2secs, even though the visited page is totally functioning (users can click and edit), the loading icon is believed to be misplaced there.
Loading Speed	The application took around 3 secs to open, and a total 5-7 secs to load the user into the main page. Everytime user clicks on any of the jobs, it would take around 3 secs to load into it as well.
UI hangups	Did not find any hangups that require restarting the app
Presence of Advertisement	No
Users are valuable customer	Its very convenient for user to see how much they earn, pending payment, upcoming job(s) too. Only weakness is that there is no any sort of filtering when searching for jobs
Worthy functionalities	<ul style="list-style-type: none"> <li>- App keep track of payment and cash out history</li> <li>- App has a "Save job" feature to wishlist</li> <li>- App tells user how many hours will be used to work in a week</li> </ul>

**Figure 3.4: Dashboards of FastGigs**

The figure consists of three side-by-side screenshots of the FastGigs mobile application interface.

- Left Screenshot:** The "My Profile" screen. It displays "EARNINGS THIS WEEK" (RM0.00), "HOURS BOOKED THIS WEEK" (0), "NO SHOW THIS WEEK" (0), and "CANCELLATION THIS WEEK" (0). Below this, a message says "You do not have any upcoming jobs. Find a flexi job today and start earning!" with a "Browse Jobs" button.
- Middle Screenshot:** The "Payments" screen. It shows "TOTAL EARNINGS" and "PAID OUT" both at RM0.00. A message indicates "You are just RM50 away from receiving your payout!". Below this is a "Payment History" section with tabs for All, Pending, Processing, and Paid. It states "Bi-Weekly payout will be processed once a minimum of RM50 is earned".
- Right Screenshot:** The bottom part of the "My Profile" screen, showing a summary of gig hours worked (0hrs) and total jobs cancelled (0). At the bottom, it says "There are no payments to be shown".

**Figure 3.5: Job Searching in FastGigs**

The figure shows a screenshot of the FastGigs mobile application displaying job listings for AEON.

**Job Listings:**

- Cashier:** RM8.00/h, 1 Outlet, \$ Incentives. View Job Details & Locations →
- Store Associate:** RM8.00/h, 1 Outlet, \$ Incentives. View Job Details & Locations →
- WAREHOUSE PACKER:** RM7.00/h, 1 Outlet. View Job Details & Locations →

**Job Detail for Cashier:**

**Aeon Midvalley**  
Unit AT3 Mid Valley Megamall Mid Valley City Lingkaran Syed Putra 59200 Kuala Lumpur

There are 18 job slots available for booking.

Date	Time	Rate
Monday, 28 Feb 2022	11:00AM - 09:00PM	RM8.00/h
Tuesday, 01 Mar 2022	11:00AM - 09:00PM	RM8.00/h
Wednesday, 02 Mar 2022	11:00AM - 09:00PM	RM8.00/h
Thursday, 03 Mar 2022	11:00AM - 09:00PM	RM8.00/h
Friday, 04 Mar 2022	11:00AM - 09:00PM	RM8.00/h

**Bonus Incentives!**  
You will be paid incentives which is an additional earnings for you on top of the base pay that will be given.

**Job Description:**

\*INCENTIVE: Additional RM100 if you work 6 days in one week (Monday to Sunday)\*

\*ON-THE-JOB TRAINING WILL BE PROVIDED ON THE FIRST DAY BY AEON (only on a weekday: Monday, Tuesday, Wednesday, Thursday or Friday)\*

**CORE RESPONSIBILITIES:**

- Handle cash transactions with customers using cash registers;
- Scan goods and collect payments;
- Issue receipts, refunds, discounts, etc.;

**Buttons:** Home, Browse, My Jobs, Payments, Profile, Save Job, Chat, Select Location & Slot, Select Slots.

**Figure 3.6: App Bug of FastGigs**

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**Job Locations**

Select the outlet that you wish to book your slots at.

Step 2: Confirm Location & Slots →

Overall, FastGigs is not that applied into Malaysia market but from the short user experience there are a few things we can conclude, strictly speaking, FastGigs is not providing much of a gig jobs opportunities, as most of the jobs under the app needed workers to present at a workplace instead of working from home or over the internet. Also, the application overall give a messy feeling to its users due too many buttons and dashboard, the loading speed was also quite slow, although it might be due to the phone performance. However, the payment dashboard of the application is something to learn from. As the intended application would allow user to take up multiple jobs, the payment should be keep tracked too, after a job is done, perhaps the user that offered the job would be required to make payment for a fixed duration of time.

The last application to review is Freelancer, Freelancer is the world largest gig economy platform, it has users across 247 countries, regions and territories. Over 128 category jobs for the talent to choose from. Upon registering, the application will ask the interested category of its user, a very interesting category is called “Job for anyone”, it would allow users with no skills to start working under the platform as well, this is perfectly suitable for university students, which is targeted potential users for the project. Users are only allowed to pick 20 categories and it's editable after they set up the account.

**Table 3.3: Application Review on Freelancer**

Aspect	Evaluation [Tested on Huawei Nova 2i]
Stability and Reliability	The application reacted excellently when there is no internet connection, a temporary page will pop telling its user that it can't load the page, and a “Retry” button is available for quick refresh
Consistency of the Platform	UI and UX are done well, icons are much used in the bottom nav bar instead of words, it would take some time for user to understand what each icon means but overall good experience
Loading Speed	The app took around 8secs to open and each time a page is clicked, it would take 4-5secs to load. Slowest among all test application, but was highly believed that its the device's issues
UI hangups	Buttons are not as responsive probably due to the loading speed
Presence of Advertisement	No, but the app has a new dashboard to inform users on latest features and promote the app's premium version
Users are valuable customer	Yes, be it user coming as talent or client, the app provide total support and easy accessed dashboard to help with. As talent, the filter and sort function is very tailored made including aspects like price range, skills needed, project location and even client location
Worthy functionalities	<ul style="list-style-type: none"> <li>- A very detailed filter and sort</li> <li>- Community groups are available to connect and network with people with common interest</li> <li>- Strict security, not allowed to take up jobs without completing profile</li> <li>- Clear client information was displayed, non-biased</li> </ul>

**Figure 3.7: Dashboards on Freelancer**

The image displays four screenshots of the Freelancer.com dashboard, arranged vertically.

- Home:** Shows a news feed with a message about a free upgrade to Plus Membership. It lists several benefits: Freelancer Rewards, 100 Bids Per Month, 80 Skills on your Profile, Freelancer Rewards again, and 5 External Invoices Per Month. A button at the bottom says "Claim it now for Free!"
- Projects:** Shows a search bar for "Search freelancers, projects, contests". Below it, tabs for "Freelancers", "Projects" (which is selected), and "Contests" are visible. A "Filter and Sort" button is present. To the right, there are tabs for "Bids", "Current Work", "Past Work", and "Contests". A search bar for "Search Projects" is also present.
- Groups:** Shows a "Recent Activity" section with a post from @LautaroPFP about General Announcements. Below it, a "Preferred Freelancer" banner is displayed.
- Menu:** Shows a profile for Zheng Hao L. (@ZhengHao946). It includes sections for "My lists", "Membership", "Settings", "Balance" (\$0.00 USD), "Make a deposit", "Withdraw funds", "Transaction history", "Payment sharing", "Support", "Invite friends", and "Language" set to English.

**Figure 3.8: Filter and Sort of Freelancer**

The image shows three identical filter and sort interfaces for freelancers, each with a header 'Filter and Sort' and a 'See results' button at the bottom.

**Sort by:** Latest

**Skills:** C++ Programming

**Project type:** Fixed Price, Hourly Rate

**Fixed price:** min \$ 0, max \$ 1500+

**Hourly rate:** min \$ 0, max \$ 80+

**Listing type:** Featured, Sealed, NDA, Urgent, Fulltime, Recruiter

**Project location:** Enter a location

**Client's country:** Search countries

**Languages:** Bahasa Malaysia, English

**Figure 3.9: Job Acquiring of Freelancer**

The interface shows a project listing for 'Abbas K.' with a dark theme.

**Contact Abbas K. about your job**

**Project Name:** Project for Abbas K.

**Send a private message:** Hi Abbas K., I noticed your profile and would like to offer you my project. We can discuss any details over chat.

**Hire for:** Fixed Price (selected), Hourly Rate

**Budget:** \$ 250 USD

**Details:** Proposals

**Complete your profile:** Please complete these 3 steps before bidding on the project

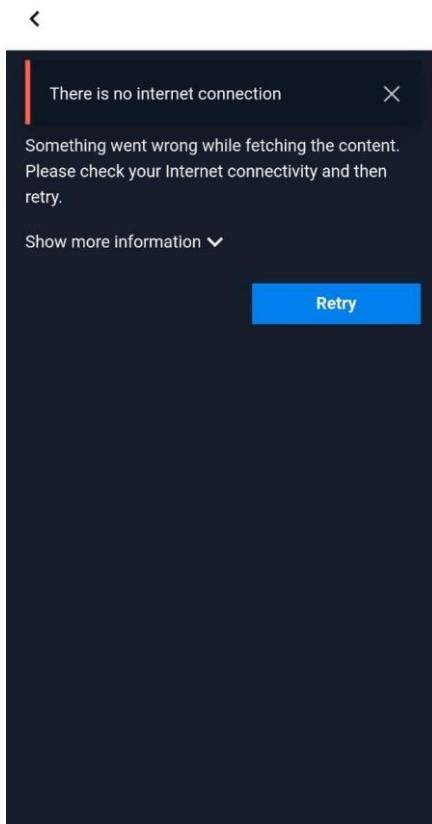
- Update your skills
- Verify your email
- Update your profile

**Note:** Enter an hourly rate for your profile to bid on this project. This will not affect your bid on a particular project, it is just to give employers an idea of the rate you typically work at.

**Profile Picture:** A small thumbnail of a man with glasses and a black shirt.

**Figure 3.10: Lost Connection Page on Freelancer**

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Overall, Freelancer is considered the best application among the 3 applications that were reviewed. It basically included all benefits from the previous 2 applications which are easy to search for jobs, react well to bugs and abusive actions, tracking of payment and strict security. Something to take note for the application that this project is building is, to make the final product similar to the interface of Freelancer but smoother UI and UX, Freelancer mobile application is not optimized for low performance smartphones and that could potentially cause low satisfaction from users. Freelancer is also accepting talent other than students, which could make the competition tight for inexperienced students as well, that should be well taken care of with our system only allowing students to create an account.

## 4.0 Problem Statements

**Table 4.1: Problem Statements of The Project**

No	Problem Statement
1	Students of UMS does not have a platform that post and take up gig opportunities around them
2	There is a lack of space where students in UMS can provide networking and encourage student to help each other while acquire access to extra income at the same time

The project is trying to solve a few issues, first being students of UMS does not have a platform that post and take up gig opportunities around them, to be more exact, there is not a platform in UMS specially for students, that is, in terms of types of jobs, duration of jobs, price range and recognition from university. Types of jobs that the platform is planned to offer are as:

- Assets sharing: tuition for students, mentoring for juniors, printing, delivery of items, run errands
- HGIM (Household and Miscellaneous services): pet care, cooking, baking, housekeeping

Jobs in the platform are expected to be more of “one-time” jobs and can be completed within hours if not, maximum to take a day. Current gig economy platforms take up too much time and require consistent commitment which is not suitable for students as this could potentially affect the academics of students. The platform aims to solve financial needs for students and not lower the quality of graduates at the same time. The price range of services demand is also expected to be “student-friendly”.

The platform will also be requesting for university verification before deploying for the students, this will highly increase the security of the platform as security measures like logging in as students only can be implemented.

## **5.0 Project Objectives**

The project's objectives are as below:

- To design an exclusive gig economy network that is recognized by UMS for UMS students
- To develop a mobile application that allows users to demand and accept job offers
- To evaluate the developed mobile application

## 6.0 Project Scope

The system's target users are mainly students that are currently studying in UMS. As both the offer and accept the gig jobs are done by students, any student that has an account on the platform would be able to put up jobs and accept jobs in a single dashboard.

**Table 6.1: Functionalities of Each Module**

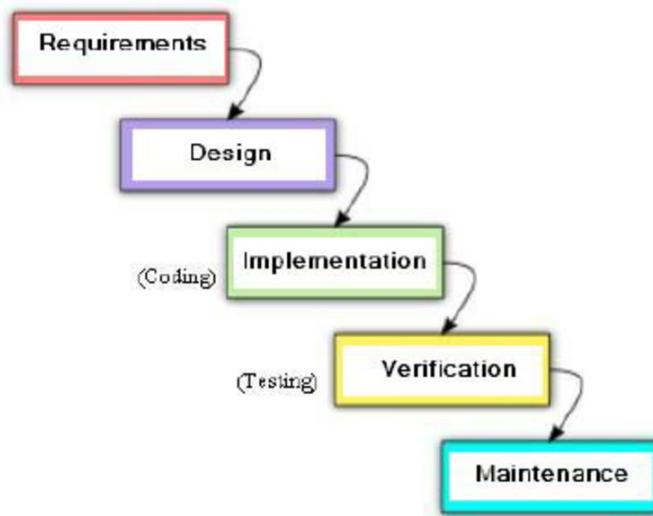
Module	Sub-module	Description
Admin Dashboard	Superuser	Able to perform CRUD on every information in the system
User Management	Sign up	For new users, verification of student is needed to proceed
	Login and logout	Users can login and out from the system
	Manage profile	View user's rating, edit user profile that includes user's interest, past experience and location
Talent Dashboard	Jobs searching	Predictive analytics will be applied to suggest the jobs users might want; filter is also available
	Chat with job owner	Communicate with job owner
	Jobs application	Request for job taking, arrange for meetup/meeting date, time and any remarks
	Jobs closing	Rate and review job owner
Job Owner Dashboard	Jobs posting	Post job with details like price, location, job description
	Chat with talent	Communicate with talent
	Talent enrolment	Accept request, confirm meetup/meeting date, time and any remarks
	Jobs closing	Rate and review talent
	Payment	Payment to talent and tipping

## 7.0 Project Methodology

The methodology that is going to be implemented for this gig economy platform development is the waterfall methodology. There are a few reasons for picking up waterfall method, 1 of the reasons being the inexperience of the developer for this project. Waterfall methodology promotes simplicity throughout the development in which processes proceeds according to phases. This is perfect especially for first timer to learn and understand basics of a software development.

Another reason for using waterfall software development is also due to the sufficient time for the project. Waterfall methodology often perceived as a methodology that takes a long time to complete, but it's actually easier to control with the clear milestone of the methodology. Let say each phase takes around 1 month, the project can be completed within 5 months.

**Figure 7.1: Waterfall Software Development**



The processes that will be executed throughout the area namely requirement, design, implementation (coding), verification (testing) and lastly, maintenance.

For requirements, the main activities to be executed are interviewing potential users and reviewing the current system. To understand the point of view of the users towards to new gig economy platform, qualitative and quantitative surveys will be distributed towards students in UMS, data collected will be analysed to find out the common requirements. Next, reviewing of the currently existing systems would take

place, fortunately, all of the current existing applications are mobile applications, hence a set of rubrics that is adapted from a post on DotNet, a website community of .NET developers done by Delimarsky on 2011 will be used. Based on Delimarsky, 7 aspects to evaluate a mobile application are stability and reliability, consistency of the platform, loading speed, no UI hang-ups, no advertisements, consider the users as valuable customers and provide worthy functionalities. For this project, worthy functionalities have a different definition here and that is according to the features that is going to be implemented on this new gig economy platform, functionalities will be compared in the context of creating an exclusive gig economy network that is recognized by UMS for UMS students.

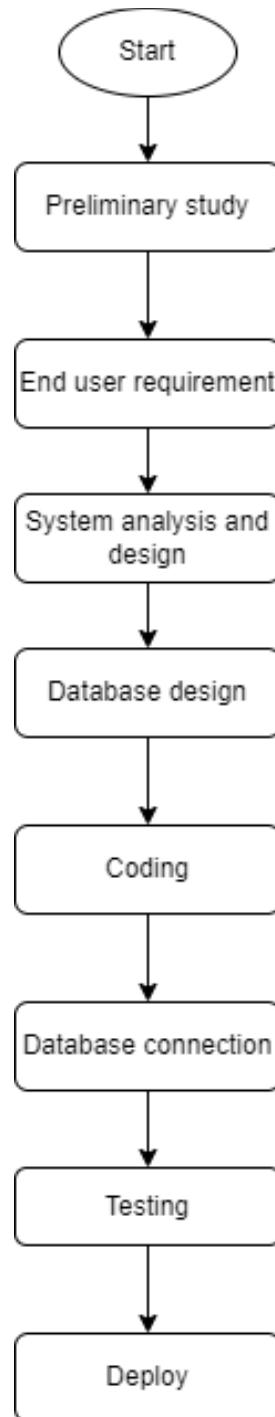
For the design phase, the main tools that will be used to create diagrams, charts and figures will be Microsoft Visio, Draw.io and Projectlibre. As these platforms are free to use.

Development would be the most important phase; the gig economy platform is going to be a mobile application available for both Android and iOS users. Hence, the tools that will be used to develop a cross-platform application are React Native. It allows code sharing across platforms using only 1 codebase. An extra skill to develop in order to start developing the application is familiarity with JavaScript and JSX, a mix of JavaScript and HTML type syntax.

Testing will take place after the coding is done to evaluate the system, according to IBM, there are 11 software tests, namely acceptance testing, integration testing, unit testing, functional testing, black-box testing, performance testing, load testing, regression testing, sanity testing, stress testing and usability testing. This set of tests will be adopted and to be implemented to the system. The testing tools to be used is Monkey Talk, it is an automated testing tool that can apply to both Android and iOS.

## 8.0 Flow Chart of Activities

**Figure 8.1: Flow Chart of Activities of the Project**



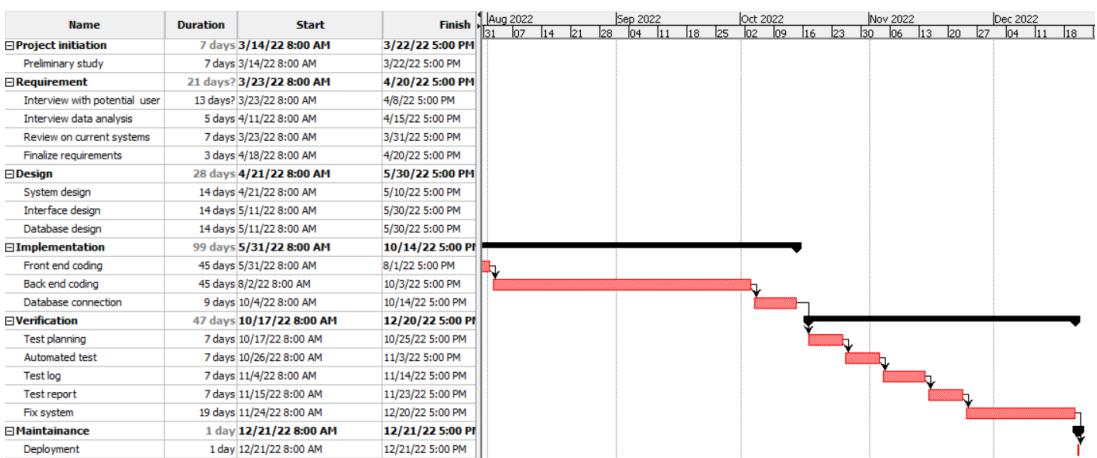
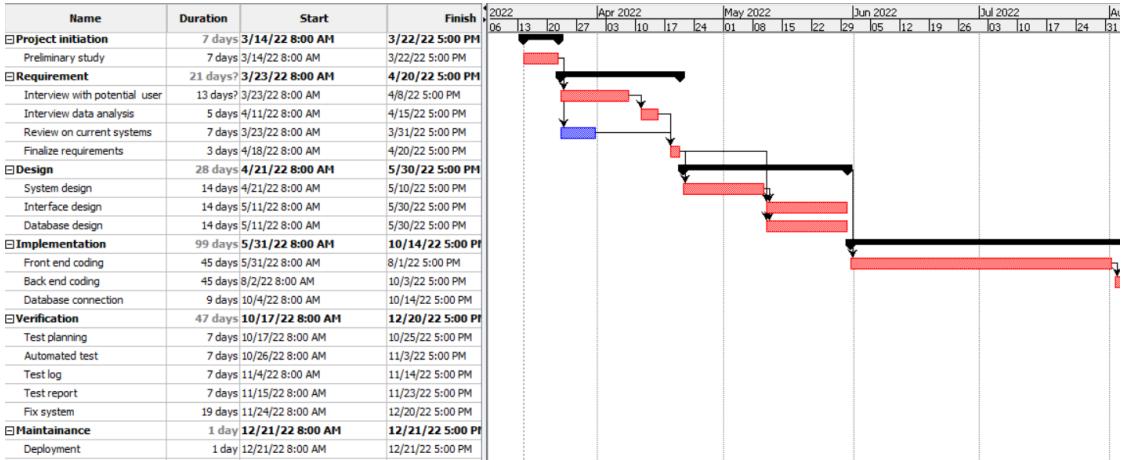
## 9.0 Milestones and Dates

**Table 9.1: Milestones and Dates of the Project**

Milestone	Date
Complete preliminary study	20 March 2022
Identify problem statements, objectives and methodology	30 March 2022
Complete qualitative and quantitative interview	10 April 2022
Completed requirement gathering	21 April 2022
Progress report submission	22 April 2022
Progress presentation	29 April 2022
Completed system analysis and design	20 May 2022
Complete database design	30 May 2022
Project I report submission	17 June 2022
Project I presentation	24 June 2022
Completed front end coding	20 September 2022
Completed back-end coding	30 September 2022
Completed database connection	15 October 2022
Progression report submission	11 November 2022
Progress presentation	18 November 2022
Software testing	20 December 2022
System deployment	21 December 2022
Project II report submission	31 December 2022
Project II presentation	7 January 2023

## 10.0 Gantt Chart

**Figure 10.1: Gantt Chart of the Project**



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## APPENDIX A: Turnitin Plagiarism Full Report

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# Proposal Final

*by Liew Zheng Hao*

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**GIG ECONOMY PLATFORM FOR UMS STUDENTS  
USING PREDICTIVE ANALYTICS**

**LIEW ZHENG HAO**

**FACULTY OF COMPUTING AND INFORMATICS  
UNIVERSITY MALAYSIA SABAH  
2022**

**NAME** : LIEW ZHENG HAO  
**MATRIC NUMBER** : BI19110215  
**TITLE** : GIG ECONOMY PLATFORM FOR UMS STUDENTS USING  
PREDICTIVE ANALYTICS  
**DEGREE** : BACHELOR OF COMPUTER WITH HONOURS  
(SOFTWARE ENGINEERING)

**APPROVED BY;**

1. **SUPERVISOR**

Dr.Chin Pei Yee

Signature

\_\_\_\_\_  
(DATE: \_\_\_\_\_)

## **DECLARATION**

I hereby declare that the material in this thesis is my own except for quotations, equations, summaries and references, which have been duly acknowledged.

DD MONTH YEAR

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LIEW ZHENG HAO

BI19110215

## **ABSTRACT**

9

Gig economy is identified as a new source of economic growth and would be made part of the 12th Malaysia Plan in the recent news. While this is going to better help independent workers to make their way in the gig economy, students should also be able to gain benefit from the emerging gig economy. It is becoming more of an issue that university students need to work while studying to cover the fund needed to complete their studies. Gig economy platforms in Malaysia are currently focussing more on skilled workers instead of unskilled and inexperienced parties such as university students. To better allow students in Universiti Malaysia Sabah (UMS) to be involved in the gig economy, this project is going to design and develop a gig economy platform exclusively for UMS students. The system authentication would only be limited to student mails to ensure no outsider into the platform. With applying predictive analytics, the system is going to make smart predictions of jobs towards its users and this will allow students to choose from various options. The application would allow students to demand and accept job offers from another student. It is expected that this project is going to help students with getting extra money from quick jobs and at the same time enjoy services created by the student community which are at a lower price.

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# **FINAL YEAR PROJECT**

## **PROPOSAL**

### **1.0 Introduction**

Gig economy is something that is seen more and more often throughout these few years.<sup>4</sup> The term “gig economy” was coined by English journalist/author Tina Brown in 2009 in the aftermath of the global economic recession to describe a work-world dominated by free-floating projects, consultancies and part-time bits. (The star, 2021).

There are a lot of platforms that are offering gig jobs for Malaysians, some examples are freelancer.com, thekedua.com, rtist.com.my. While offering flexibility for its talents’ working hours, gig economy also gives reasonably good and instant money. However, all of these existing solutions have a common weakness to it, it is not customized for students who are in their studies to get started easily as there will be skills gap between them and the skilled workers. Students might also find the jobs offered in these systems still requires too much time and consistent commitment, which is an issue because not all students are able to free up enough time from their studies for side income.

Therefore, this project aims to create a gig economy platform that would allow university students to offer quick and easy gig jobs, such as tutoring, mentoring, printing, cooking, pet care, product/software tester and many more, to other university students that are in the same or nearby areas. The platform would be created to be a mobile application that is named by “Gigverse” and it will be cross-platform for both Android and iOS users. Creating this new ecosystem in university campuses can help students to get quality, convenient and cheaper services. The many scopes and sectors of jobs allow students to choose from, some jobs can even

potentially allow university students to gain some practical experience for their career expertise.

## 2.0 Problem Background

With the blooming industry of technology, online platforms have been readily and easily accessible anywhere and anytime by anyone, giving rise to the number of workers in the gig economy (Paul Hype Page, 2020). For people with disabilities and the B40 (bottom 40% income group), the gig economy has provided access to fair, sustainable and productive means of earning a living with low barriers to entry. Hence, policies on the gig economy should factor in the preferences of such workers (Rahim *et al.*, 2021).

As mentioned in the introduction, an emerging issue about gig economy is how students might find it hard to take up jobs from the existing platform due to the skill gaps. Currently, there is not a gig economy platform in Malaysia that is only open for students and offer gig jobs that is suitable for students' free time and at their convenience. It is something needed as this is going to help students to overcome the tight competition with skilled gig workers, eventually exposed them to gig economy the right way, enable them to be benefited from the gig economy.

A survey report from Upwork shown that in 2020, 59% of Gen Z are freelancing part-time, while 64% of the respondents see freelancing as a temporary way of making money. As of the year 2020, according to World Bank, 26% of Malaysians are gig workers, that is approximately 4 million Malaysians are working in the gig economy. In the next five years, the gig workers are estimated to be 40 percent of Malaysia's workforces and will contribute 26 percent to economic growth (Jaafar, 2020). These data show the potential of gig economy becoming a norm for people no matter they are students, fresh graduates or skilled workers.

To bring it back to the root cause, the main reason Malaysian students are interested to participate in the gig economy is due to insufficient financial support. According to a report from HSBC in 2018, on a global scale, 84% of the university students are working while studying, in Malaysia, 9 out of 10 university students are working during their studies, and the reason is that they needed extra money to fund

their studies. A gig economy platform that is able to provide suitable and convenient jobs for students to make easy money is what is needed.

### **3.0 Literature Review**

#### *Gig economy overview*

Gig economy refers to temporary and flexible jobs offered by companies or anyone who needs related services, gig economy involves independent workers instead of full-time employees. It is referred to as "crowdsourcing", the "sharing economy" and the "collaborative economy" (Stewart & Stanford, 2017). Gig economy is getting popular across the globe throughout these years, all contributed by the mode of jobs which are remote, free to choose the type of job, quick and good money and also the advancement of technology that enables virtual working with efficiency. In Malaysia, under the recently unveiled 12th Malaysia Plan 2021-2025 (12MP), the government has assured that it will create an ecosystem that supports the development of the gig economy to encourage the people to take full advantage of this opportunity (The Star, 2021).

Gig economy has benefited a lot of people including skilled independent workers, full time workers that wish to get some side income and even to students that are currently in their studies. According to TechnoJobs, an IT job site based in UK, in an ever-competitive marketplace, it is getting harder than ever for young people to stand out and secure valuable opportunities for work placements, internships and even apprenticeships. Hence, gig economy has presented a perfect opportunity for youth that are studying to get practical experiences and beautify their resume to help them secure better jobs in the future. It is not just about getting practical experience, in Malaysia, 9 out of 10 students are working temporarily while studying in order to get enough funds to support their studies.

However, that is not always the case for most of the students. Current gig economy in Malaysia does not actually allow students to make the most out of it. Reasons being, firstly, the tight competition between students and skilled workers. Students often find themselves not chosen, if not, are not capable of the jobs available on current existing gig economy platforms. Secondly, most of the gig jobs in Malaysia nowadays still take up pretty much time off students, causing them to

sacrifice their study time. In the long run, this could result in having low quality graduates.

#### *About this project*

This project's goal is to solve this issue that no current existing gig economy platforms can solve, which is to develop a gig economy environment exclusively for students to demand and accept job offers. The system is going to be developed into a mobile application that is available on both Android and iOS, allowing every student that has a device to be involved. The name of the application is going to be "Gigverse".

1 of the key features of the application is that we would work together with university administration to provide credibility to the application. Once it is achieved, students are allowed to create an account in the platform using their student mail, and verification of students will be implemented to make sure there are only students in this gig economy platform. This could also help give confidence towards the students about the security of the platform.

Second key feature is using predictive analytics to predict what jobs a student wants. It can be hard to choose from a large pile of gig jobs available, hence, the platform is equipped with these skills. Data collection would begin with a quick survey during their signup, to obtain information on student's interested areas, preferred location, preferred benefits from the jobs and price range. Throughout the usage of the application, user behaviour is also recorded by the analytics tool, these data will then be analysed and make smart predictions for students on the job browsing module.

#### *Review on current existing application*

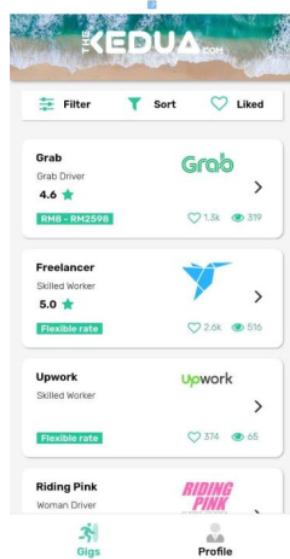
The first application to be reviewed is TheKedua, it is a mobile application created by The BSV Group Sdn Bhd since 2017. TheKedua is considered the closest platform to this project in terms of its target user demographic, which is youth that includes both those who have finished studies or still in studies. The application review is as table below.

**Table 3.1: Application Review on TheKedua**

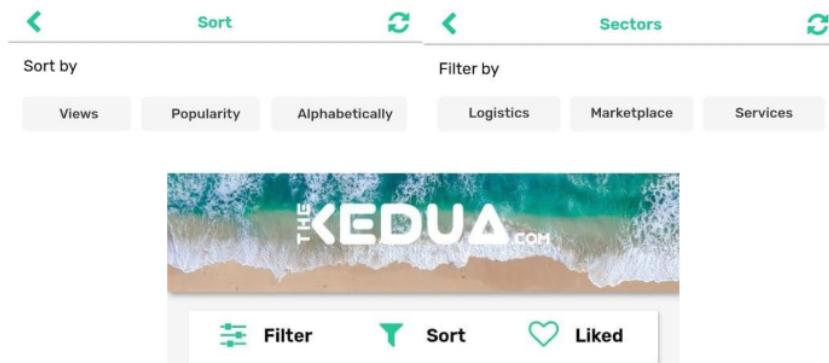
Aspect	Evaluation [Tested on Huawei Nova 2i]
Stability and Reliability	<p>The application uses somewhat a in-app browser that would collapse under condition where it is not connected to internet.</p> <p>Battery consumption was relatively low, running the application for around 10 minutes would consume 1% of battery</p>
Consistency of the Platform	In terms of UI and UX, the application done a good job with no potential abusive bugs. Users are able to scroll through items that are loaded, and that's it. There is also a loading icon everytime the app is trying to load more jobs on the dashboard.
Loading Speed	<p>The application took around 3 secs to open, and a total 5-7 secs to load the user into the main page.</p> <p>Everytime user clicks on any of the jobs, it would take around 3 secs to load into it as well.</p>
UI hangups	The only UI hangups in the application was the one mentioned above. Even when connected back to the internet, the application is no longer responsive and needs to be restarted.
Presence of Advertisement	There is averagely an ad for every 4 jobs listed out. The ads categories are: student related scholarships, TheKedua technologies ads to offer software development service, advertisement spaces for other companies
Users are valuable customer	The application is considered to be customer centric, this is shown from how the jobs was listed, it has a rating coming from previous users that tried before, a pay wage range to help user choose, also presented the number of views to this particular job
Worthy functionalities	- The application included filtering and sorting feature to help user find their jobs faster

- A “Like” feature to help keep wishlist
- An app walkthrough for new users
- User profile settings are achieve easily

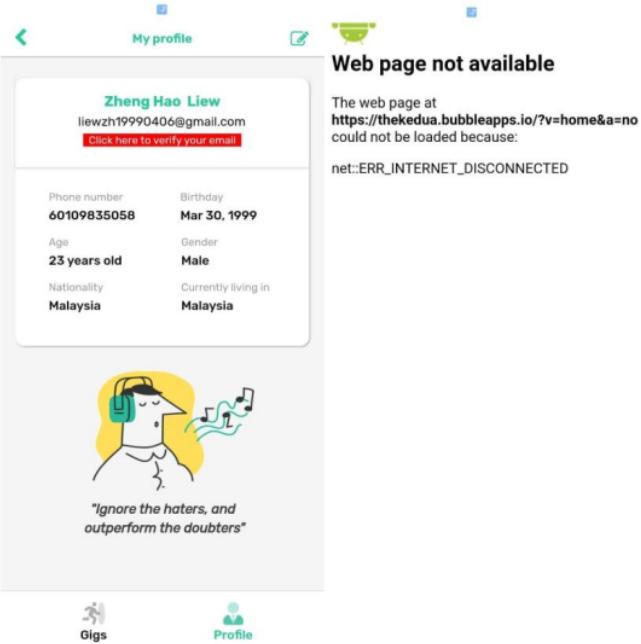
**Figure 3.1: Homepage of TheKedua**



**Figure 3.2: Filtering, Sorting and Like features**



**Figure 3.3: Weakness of TheKedua Application**



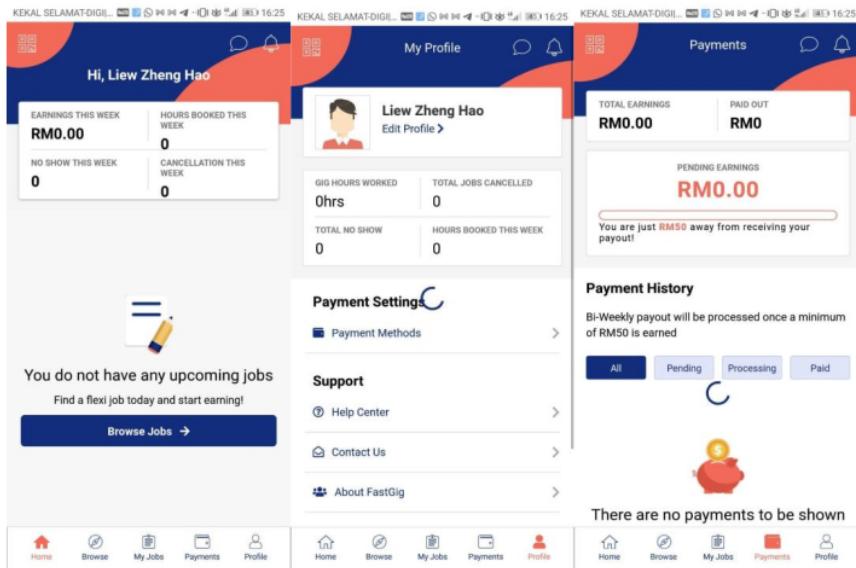
Overall, TheKedua application has some relation to the application we are building, only we have a few threats and weaknesses. To talk about the main functionality, TheKedua does not seem to fulfill its mission of offering jobs to its users. The app is more like a directory of available platforms for users to discover and make extra income out of it. The reviewing, ratings and price range does help users in choosing how they want to earn money but at the end of day, it is not an app where direct job offering and accepting is happening. The profile of the user in this application is considered simple and not much to present, to relate it to the app we are building, user profile should be filled with more information such as institution, interested areas, job experience, personal rating, short description, these can better help other users to identify the efficiency, past experience and help users to choose the right person to take the job.

The next application to review is FastGig, previously known as FastJobs, this is a gig platform that is based in Singapore. After launching and registering, the app will show the jobs that are nearby to the user. Job examples are cashier, store associate, warehouse packer etc.

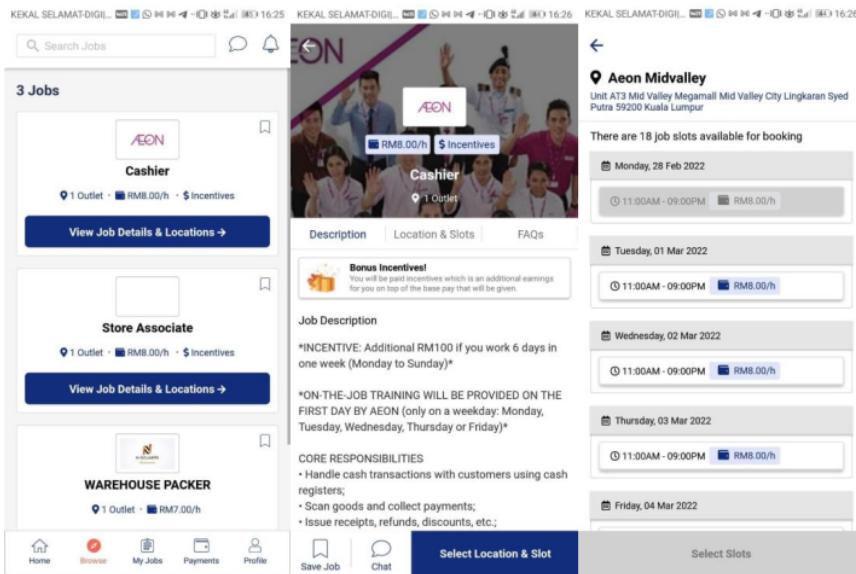
**Table 3.2: Application Review on FastGigs**

<b>Aspect</b>	<b>Evaluation [Tested on Huawei Nova 2i]</b>
Stability and Reliability	When internet connection is cut off, the app did not crash, it went into blank mode for any page that it was trying to load. No loading icon was observed. However, there is a back button in almost every page on the app, making it possible to refresh the page by clicking back and enter the intended page again, the loading page will load with this refresh when the internet connection is back
Consistency of the Platform	In terms of UI and UX, the app has a small flaw in its page which is, for every dashboard the user clicks in, there will be a loading icon appearing for around 2secs, even though the visited page is totally functioning (users can click and edit), the loading icon is believed to be misplaced there.
Loading Speed	The application took around 3 secs to open, and a total 5-7 secs to load the user into the main page.  Everytime user clicks on any of the jobs, it would take around 3 secs to load into it as well.
UI hangups	Did not found any hangups that require restarting the app
Presence of Advertisement	No
Users are valuable customer	Its very convenient for user to see how much they earn, pending payment, upcoming job(s) too. Only weakness is that there is no any sort of filtering when searching for jobs
Worthy functionalities	<ul style="list-style-type: none"> <li>- App keep track of payment and cash out history</li> <li>- App has a "Save job" feature to wishlist</li> <li>- App tells user how many hours will be used to work in a week</li> </ul>

**Figure 3.4: Dashboards of FastGigs**



**Figure 3.5: Job Searching in FastGigs**



**Figure 3.6: App Bug of FastGigs**

KEKAL SELAMAT-DIGI... 16:28



**Job Locations**

Select the outlet that you wish to book your slots at.

Step 2: Confirm Location & Slots →

Overall, FastGigs is not that applied into Malaysia market but from the short user experience there are a few things we can conclude, strictly speaking, FastGigs is not providing much of a gig jobs opportunities, as most of the jobs under the app needed workers to present at a workplace instead of working from home or over the internet. Also, the application overall give a messy feeling to its users due too many buttons and dashboard, the loading speed was also quite slow, although it might be due to the phone performance. However, the payment dashboard of the application is something to learn from. As the intended application would allow user to take up multiple jobs, the payment should be keep tracked too, after a job is done, perhaps the user that offered the job would be required to make payment for a fixed duration of time.

The last application to review is Freelancer, Freelancer is the world largest gig economy platform, it has users across 247 countries, regions and territories. Over 128 category jobs for the talent to choose from. Upon registering, the application will ask the interested category of its user, a very interesting category is called "Job for anyone", it would allow users with no skills to start working under the platform as well, this is perfectly suitable for university students, which is targeted potential users for the project. Users are only allowed to pick 20 categories and it's editable after they set up the account.

**Table 3.3: Application Review on Freelancer**

<b>Aspect</b>	<b>Evaluation [Tested on Huawei Nova 2i]</b>
Stability and Reliability	The application reacted excellently when there is no internet connection, a temporary page will pop telling its user that it can't load the page, and a "Retry" button is available for quick refresh
Consistency of the Platform	UI and UX are done well, icons are much used in the bottom nav bar instead of words, it would take some time for user to understand what each icon means but overall good experience
Loading Speed	The app took around 8secs to open and each time a page is clicked, it would take 4-5secs to load. Slowest among all test application, but was highly believed that its the device's issues
UI hangups	Buttons are not as responsive probably due to the loading speed
Presence of Advertisement	No, but the app has a new dashboard to inform users on latest features and promote the app's premium version
Users are valuable customer	Yes, be it user coming as talent or client, the app provide total support and easy accessed dashboard to help with. As talent, the filter and sort function is very tailored made including aspects like price range, skills needed, project location and even client location
Worthy functionalities	<ul style="list-style-type: none"> <li>- A very detailed filter and sort</li> <li>- Community groups are available to connect and network with people with common interest</li> <li>- Strict security, not allowed to take up jobs without completing profile</li> </ul>

- Clear client information was displayed, non-biased

**Figure 3.7: Dashboards on Freelancer**

The figure consists of three horizontal screenshots of the Freelancer.com website interface, each showing a different section of the dashboard.

- Top Screenshot (Home):** Shows the "News Feed" section with a message about a free upgrade to Plus Membership. It also displays a sidebar with benefits like "Freelancer Rewards" and a "Claim it now for Free!" button.
- Middle Screenshot (Browse):** Shows the "Projects" section with tabs for "As client" and "As freelancer". It displays a search bar and a list of top results, including a project for a "C# developer (Pakistan Only)".
- Bottom Screenshot (Groups and Menu):** Shows the "Groups" section with recent activity from users like LautaroPFF and moriahmcdonald. It also shows the "Menu" section for user Zheng Hao L., which includes options for "Tell us what you need done", "Choose a name for your project", "Tell us more about your project", and various account settings like "Membership", "Settings", and "Language".

**Figure 3.8: Filter and Sort of Freelancer**

The screenshot shows three parallel filter and sort panels, each with a back arrow and a title 'Filter and Sort'.

- Left Panel:** Sort by dropdown set to 'Latest'. Project type filters: Fixed Price (unchecked), Hourly Rate (unchecked). Fixed price range: min \$ 0 USD, max \$ 1500+ USD. Hourly rate range: min \$ 0 USD, max \$ 80+ USD. Skills dropdown: C++ Programming (checked).
- Middle Panel:** Skills search bar: 'Search skills' with 'C++ Programming' checked. Listing type filters: Featured (unchecked), Sealed (unchecked), NDA (unchecked), Urgent (unchecked), Fulltime (unchecked), Recruiter (unchecked). Project location search bar: 'Enter a location'.
- Right Panel:** Skills search bar: 'Search skills' with 'NDA' checked. Project location search bar: 'Enter a location'. Client's country search bar: 'Search countries'. Languages search bar: 'Search languages' with 'Bahasa Malaysia' and 'English' checked.

At the bottom of each panel is a blue 'See results' button.

**Figure 3.9: Job Acquiring of Freelancer**

The screenshot shows two main sections: a client's request and a freelancer's response.

**Client's Request (Left):**

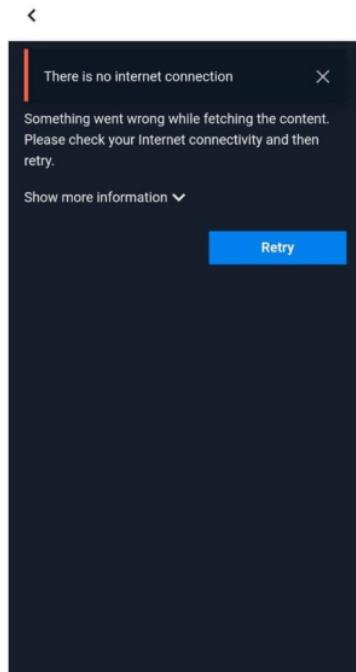
- Contact Abhas K. about your job**
- Project Name:** Project for Abhas K.
- Send a private message:** A message box containing: "Hi Abhas K., I noticed your profile and would like to offer you my project. We can discuss any details over chat."
- Hire for:** Fixed Price (radio button selected), Hourly Rate (radio button unselected).
- Budget:** \$ 250 USD.
- Agreement:** "By clicking the button, you have read and agree to our [User Agreement](#) and [Privacy Policy](#).
- Buttons:** 'Hire Abhas K.' (blue) and a 'See more' button.

**Freelancer's Response (Right):**

- I need a C++ expert w... (title)**
- Details:** Shows a notification count of 20.
- Complete your profile:** A callout box: "Please complete these 3 steps before bidding on the project". Steps: 1. Update your skills (done), 2. Verify your email (done), 3. Update your profile (in progress).
- Update your profile (callout):** "Enter an hourly rate for your profile to bid on this project. This will not affect your bid on a particular project, it is just to give employers an idea of the rate you typically work at."
- Profile Picture:** A placeholder image of a person with a camera icon.

**Figure 3.10: Lost Connection Page on Freelancer**

KEKAL SELAMAT DIGI... 16:52



Overall, Freelancer is considered the best application among the 3 applications that were reviewed. It basically included all benefits from the previous 2 applications which are easy to search for jobs, react well to bugs and abusive actions, tracking of payment and strict security. Something to take note for the application that this project is building is, to make the final product similar to the interface of Freelancer but smoother UI and UX, Freelancer mobile application is not optimized for low performance smartphones and that could potentially cause low satisfaction from users. Freelancer is also accepting talent other than students, which could make the competition tight for inexperienced students as well, that should be well taken care of with our system only allowing students to create an account.

#### **4.0 Problem Statements**

**Table 4.1: Problem Statements of The Project**

No	Problem Statement
1	Students of UMS does not have a platform that post and take up gig opportunities around them
2	There is a lack of space where students in UMS can provide networking and encourage student to help each other while acquire access to extra income at the same time

The project is trying to solve a few issues, first being students of UMS does not have a platform that post and take up gig opportunities around them, to be more exact, there is not a platform in UMS specially for students, that is, in terms of types of jobs, duration of jobs, price range and recognition from university. Types of jobs that the platform is planned to offer are as:

- Assets sharing: tuition for students, mentoring for juniors, printing, delivery of items, run errands
- HGIM (Household and Miscellaneous services): pet care, cooking, baking, housekeeping

Jobs in the platform are expected to be more of “one-time” jobs and can be completed within hours if not, maximum to take a day. Current gig economy platforms take up too much time and require consistent commitment which is not suitable for students as this could potentially affect the academics of students. The platform aims to solve financial needs for students and not lower the quality of graduates at the same time. The price range of services demand is also expected to be “student-friendly”.

The platform will also be requesting for university verification before deploying for the students, this will highly increase the security of the platform as security measures like logging in as students only can be implemented.

## **5.0 Project Objectives**

The project's objectives are as below:

- To design an exclusive gig economy network that is recognized by UMS for UMS students
- To develop a mobile application that allows users to demand and accept job offers
- To evaluate the developed mobile application

## 6.0 Project Scope

The system's target users are mainly students that are currently studying in UMS. As both the offer and accept the gig jobs are done by students, any student that has an account on the platform would be able to put up jobs and accept jobs in a single dashboard.

**Table 6.1: Functionalities of Each Module**

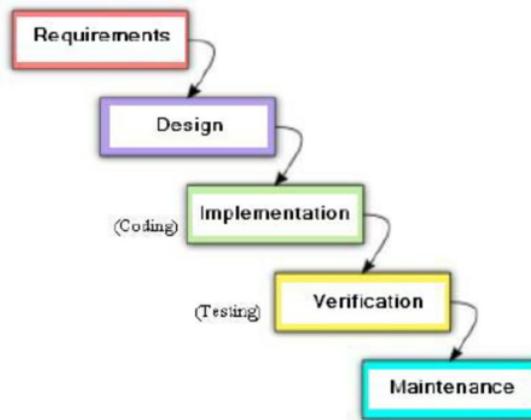
Module	Sub-module	Description
Admin Dashboard	Superuser	Able to perform CRUD on every information in the system
User Management	Sign up	For new users, verification of student is needed to proceed
	Login and logout	Users can login and out from the system
	Manage profile	View user's rating, edit user profile that includes user's interest, past experience and location
Talent Dashboard	Jobs searching	Predictive analytics will be applied to suggest the jobs users might want; filter is also available
	Chat with job owner	Communicate with job owner
	Jobs application	Request for job taking, arrange for meetup/meeting date, time and any remarks
	Jobs closing	Rate and review job owner
Job Owner Dashboard	Jobs posting	Post job with details like price, location, job description
	Chat with talent	Communicate with talent
	Talent enrolment	Accept request, confirm meetup/meeting date, time and any remarks
	Jobs closing	Rate and review talent
	Payment	Payment to talent and tipping

## 7.0 Project Methodology

The methodology that is going to be implemented for this gig economy platform development is the waterfall methodology. There are a few reasons for picking up waterfall method, 1 of the reasons being the inexperience of the developer for this project. Waterfall methodology promotes simplicity throughout the development in which processes proceeds according to phases. This is perfect especially for first timer to learn and understand basics of a software development.

Another reason for using waterfall software development is also due to the sufficient time for the project. Waterfall methodology often perceived as a methodology that takes a long time to complete, but it's actually easier to control with the clear milestone of the methodology. Let say each phase takes around 1 month, the project can be completed within 5 months.

**Figure 7.1: Waterfall Software Development**



The processes that will be executed throughout the area namely requirement, design, implementation (coding), verification (testing) and lastly, maintenance.

For requirements, the main activities to be executed are interviewing potential users and reviewing the current system. To understand the point of view of the users towards to new gig economy platform, qualitative and quantitative surveys will be distributed towards students in UMS, data collected will be analysed to find out the common requirements. Next, reviewing of the currently existing systems would take

place, fortunately, all of the current existing applications are mobile applications, hence a set of rubrics that is adapted from a post on DotNet, a website community of .NET developers done by Delimarsky on 2011 will be used. Based on Delimarsky, 7 aspects to evaluate a mobile application are stability and reliability, consistency of the platform, loading speed, no UI hang-ups, no advertisements, consider the users as valuable customers and provide worthy functionalities. For this project, worthy functionalities have a different definition here and that is according to the features that is going to be implemented on this new gig economy platform, functionalities will be compared in the context of creating an exclusive gig economy network that is recognized by UMS for UMS students.

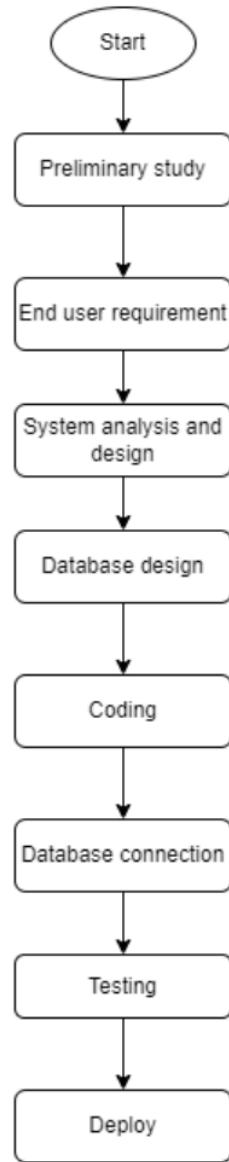
For the design phase, the main tools that will be used to create diagrams, charts and figures will be Microsoft Visio, Draw.io and Projectlibre. As these platforms are free to use.

Development would be the most important phase; the gig economy platform is going to be a mobile application available for both Android and iOS users. Hence, the tools that will be used to develop a cross-platform application are React Native. It allows code sharing across platforms using only 1 codebase. An extra skill to develop in order to start developing the application is familiarity with JavaScript and JSX, a mix of JavaScript and HTML type syntax.

Testing will take place after the coding is done to evaluate the system, according to IBM, there are 11 software tests, namely acceptance testing, integration testing, unit testing, functional testing, black-box testing, performance testing, load testing, regression testing, sanity testing, stress testing and usability testing. This set of tests will be adopted and to be implemented to the system. The testing tools to be used is Monkey Talk, it is an automated testing tool that can apply to both Android and iOS.

## 8.0 Flow Chart of Activities

**Figure 8.1: Flow Chart of Activities of the Project**



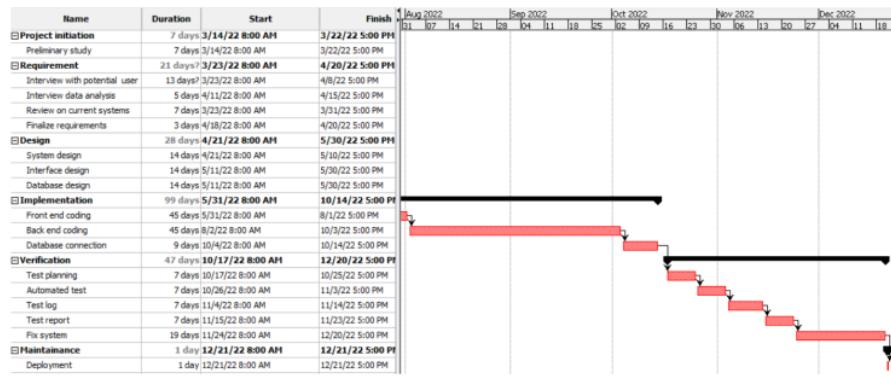
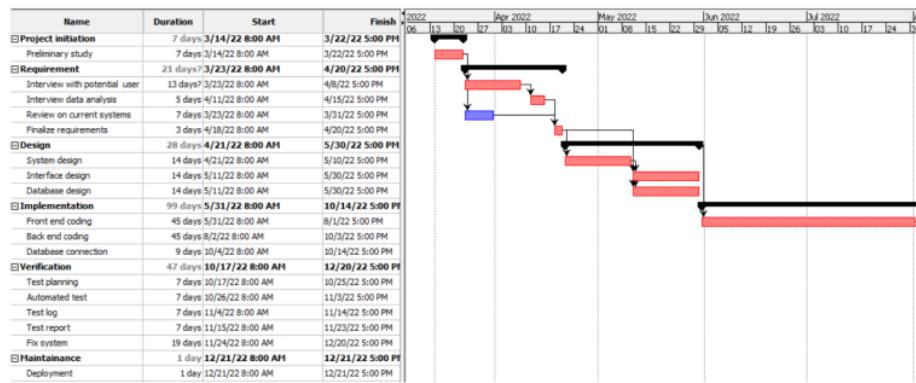
## **9.0 Milestones and Dates**

**Table 9.1: Milestones and Dates of the Project**

<b>Milestone</b>	<b>Date</b>
Complete preliminary study	20 March 2022
Identify problem statements, objectives and methodology	30 March 2022
Complete qualitative and quantitative interview	10 April 2022
Completed requirement gathering	21 April 2022
Progress report submission	22 April 2022
Progress presentation	29 April 2022
Completed system analysis and design	20 May 2022
Complete database design	30 May 2022
Project I report submission	17 June 2022
Project I presentation	24 June 2022
Completed front end coding	20 September 2022
Completed back-end coding	30 September 2022
Completed database connection	15 October 2022
Progression report submission	11 November 2022
Progress presentation	18 November 2022
Software testing	20 December 2022
System deployment	21 December 2022
Project II report submission	31 December 2022
Project II presentation	7 January 2023

## 10.0 Gantt Chart

**Figure 10.1: Gantt Chart of the Project**



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## **APPENDIX A: Turnitin Plagiarism Full Report**

# Proposal Final

## ORIGINALITY REPORT



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