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1.0 User Profiling and Task Analysis

1.1 Stakeholder Analysis

Primary stakeholders are known as direct stakeholders who experience benefits and loss directly from the system, generally are the customers. Secondary stakeholders however, influenced benefits and loss from the system without using the system, for example the advertisers. Tertiary stakeholders experience the influence even more indirectly compared to the secondary user, such as the competitors.

Stakeholder	User	Justification
Primary	<ul style="list-style-type: none">• System Administrator• Customer Service• General Public	<ul style="list-style-type: none">• System Administrator has full access to the system functions in order to monitor the system.• Customer Service interacts with the system by posting and monitoring frequently asked questions (FAQ) in the forum and reply the posted questions by the customers.• General Public will directly interact with the system and use its features.
Secondary	<ul style="list-style-type: none">• Advertiser	<ul style="list-style-type: none">• Advertiser gain profit from the system indirectly through advertisements.
Tertiary	<ul style="list-style-type: none">• Competitors	<ul style="list-style-type: none">• Competitors influence the business with similar applications or systems.

1.2 Data Gathering Selection & Justification

Data Gathering techniques are crucial to create the user profiling table in order to monitor the list of requirements. Data gathering techniques are categorized into quantitative analysis and qualitative analysis, which in this case the survey is studying documentation is considered as

qualitative analysis, whereas the survey is considered as both quantitative analysis and qualitative analysis.

Data Gathering Techniques	Justification
Questionnaire and Surveys	Due to the nature of the product, questionnaire and surveys is the preferred technique to conduct data gathering on the users by using an online survey form which gathers both quantitative and qualitative data. The response rate depends on both the quantity and nature of the questions.
Studying Documentation	Quantitative data can be obtained by studying the relevant documentation thru filtering and categorizing. This technique can be done on the documentations related to the product from past to present in many forms such as statistical reports and minutes of meeting.

Questionnaire and Surveys

The user of the product can answer the online questionnaire and survey form in exchange of seven days free ads as a compromise. The user will be notified about the online form monthly for data consistency.

Blank sample

System Survey

*Required

What is your age? *

☐ Age < 20

☐ 20 - 26

☐ 27 - 35

☐ 36 - 45

☐ Age > 45

What is your gender? *

☐ Female

☐ Male

☐ Prefer not to say

☐ Other: _____

Figure 1: A screenshot of survey

What is your area of expertise? (Optional)

Your answer _____

How much is your income? (optional)

Your answer _____

Where are you from? (Optional)

Your answer _____

What is your education level? (Optional)

Your answer _____

Are you single? (Optional)

☐ Yes

☐ No

☐ Other: _____

Figure 2: A screenshot of survey

Do you have any disabilities? (Optional)

☐ Yes

☐ No

☐ Other: _____

What is your rating on this application? *

1 2 3 4 5

Bad ☐ ☐ ☐ ☐ ☐ Good

What issues do you frequently encounter while using this application? (More than 1 option)

☐ No problem

☐ Application Lag

☐ System Bug

☐ System Crash

☐ Difficulty on using the application


☐ Incompatible device

☐ Account Issues

Figure 3: A screenshot of survey

Studying Documentation

Sufficient data can be obtained from past documentation related to the product such as from the competitors in the same industry. The raw information will be categorized and filtered before further analyzing.


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(54) **METHOD AND SYSTEM FOR TRANSACTING WITH A TRADING APPLICATION**

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(72) Inventors: **Dominic Crosthwaite**, London (GB); **Alexander M. Costakis**, Los Angeles, CA (US); **Michael N. Semegran**, New York, NY (US)

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(57) **ABSTRACT**

A method for transacting with a trading application includes receiving an order message from a short message service component. The order message comprises a first short message comprising order information converted into a second format. The order information relates to an order for a trading system. The method includes processing the order information and transmitting order processing information in the second format to the short message service component to be converted into a second short message comprising the order processing information. The method may include charging a fee to an account of a user for transmitting the first short message comprising order information. The order information may comprise a buy or sell order for a first number of shares of an instrument representing an entertainment entity.

Figure 4: A screenshot of a document about the method and system for transaction

[CITATION Cro17 \l 1033]

Stock Trading Using Analytics

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Abstract

The primary challenges with stock trading are the identification of the profitable stocks and trading those stocks without human errors and interference of personal sentiments in order to reap better returns. In this paper, we propose the automated stock trading in a semi-automated manner. We combine the usage of both fundamental and technical variables in the prediction of profitable stocks using the machine learning algorithm SVM. These stocks are then traded using stop loss/gain criteria. We buy/hold/sell the stocks based on the rules configured in the self-developed automated trading application.

Keywords

Stocks, Auto Trading, Support Vector Machines, Trend Following, Machine Learning

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Figure 5: A document related to stock trading using analytics [CITATION Man16 \1033]


 US00D761294S	
(12) United States Design Patent Weeresinghe	(10) Patent No.: US D761,294 S (45) Date of Patent: Jul. 12, 2016
(54) DISPLAY SCREEN OR PORTION THEREOF WITH STOCK TRADING GRAPHICAL USER INTERFACE (71) Applicant: Ustocktrade LLC , Newton, MA (US) (72) Inventor: Anthony Weeresinghe , Chestnut Hill, MA (US) (73) Assignee: Ustocktrade LLC , Newton, MA (US) (**) Term: 15 Years (21) Appl. No.: 29/527,451 (22) Filed: May 19, 2015 (51) LOC (10) CL 14-04 (52) U.S. CL D14/486 USPC D14/486 (58) Field of Classification Search USPC D14/485-495 CPC ... G06F 3/0482; G06F 17/211; G06F 3/1251; H04N 1/00408; H04M 1/72583; G06Q 40/04; G06Q 40/06 See application file for complete search history.	D748,114 S * 1/2016 Leyon D14/486 2008/0165153 A1 * 7/2008 Platzer G06F 1/1626 2013/0146653 A1 * 6/2013 Hart G06F 17/30 2014/0059466 A1 * 2/2014 Mairs G06F 3/0482 2014/0189608 A1 * 7/2014 Shuttleworth G06F 3/0484 2015/0346919 A1 * 12/2015 Robbin G06F 3/048 715/863 715/855 OTHER PUBLICATIONS "CommSec". play.google.com [online]. Feb. 16, 2016 [retrieved Mar. 14, 2016]. Retrieved from the Internet: <URL: https://play.google.com/store/apps/details?id=au.com.commsec.android.CommSec>.* (Continued) Primary Examiner — Karen E Kearney Assistant Examiner — Megan M Majcher Hartnett (74) Attorney, Agent, or Firm — Cesari and McKenna, LLP; James A. Blanchette CLAIM (57) I claim the ornamental design for a display screen or portion thereof with stock trading graphical user interface, as shown and described.
(56) References Cited U.S. PATENT DOCUMENTS D403,313 S * 12/1998 Peppel D14/486 D586,821 S * 2/2009 Koh D14/486 D608,366 S * 1/2010 Matas D14/486 D657,369 S * 4/2012 Hecht D14/486 D666,626 S * 9/2012 Mori D14/486 D720,765 S * 1/2015 Xie D14/486 D720,766 S * 1/2015 Mandal D14/486 D722,071 S * 2/2015 Kim D14/486 D726,736 S * 4/2015 Smirin D14/485 D733,175 S * 6/2015 Bae D14/486 9,131,063 B2 * 9/2015 Larson G06F 3/0482 D743,999 S * 11/2015 Villamor D14/488 D744,000 S * 11/2015 Villamor D14/488	DESCRIPTION FIG. 1 is a front view of a display screen or portion thereof with stock trading graphical user interface showing the new design; FIG. 2 is a front view of a second embodiment thereof; and FIG. 3 is a front view of a third embodiment thereof. The outermost broken line showing of the display screen is for the purpose of illustrating environment and forms no part of the claimed design. The broken line showing of elements on the display screen illustrate portions of the article and form no part of the claimed design.
1 Claim, 3 Drawing Sheets	

Figure 6: A document related to stock trading graphical user interface [CITATION Wee17 \1033]

1.3 Analysis & Impact

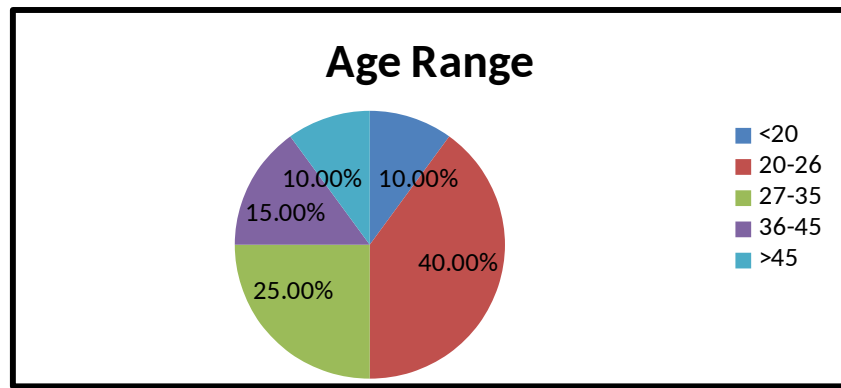


Figure 7

Justification: The question asked was meant to collect the data about the age range of the users in order to supervise the preference designs and features based on the age group, as different age group has different preference.

Analysis: Based on the results collected, it was found that majority of the users is in the age range of 20-26 which is about 40%, whereas the age group of 27-35 is about 25% which ranked second in ratio. In other words, majority of the users will have preference on modern designs and features.

Impact: This will influence the design of the application to implement modern elements suits to the preference of the users, such as similar features from other IT products being implemented in this application.

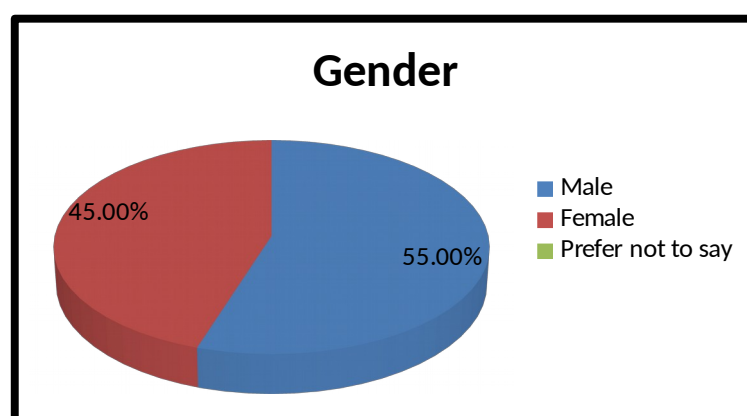


Figure 8

Justification: The question asked was meant to collect the data about the gender ratio of the users to furthermore classify the preference designs and features based on the gender group.

Male users and Female users will have some different preference such as the color and the words.

Analysis: Based on the results collected, it was found that the ratio of male users is slightly higher than the ratio of female users, which is 55%. We may conclude that male users have higher interest towards this application compare to female users.

Impact: This will influence the design and usability of the application to find a balance point between the male users and female users in terms of designs and features preference, which the designs and features will slightly biased towards Male users based on the ratio from the result.

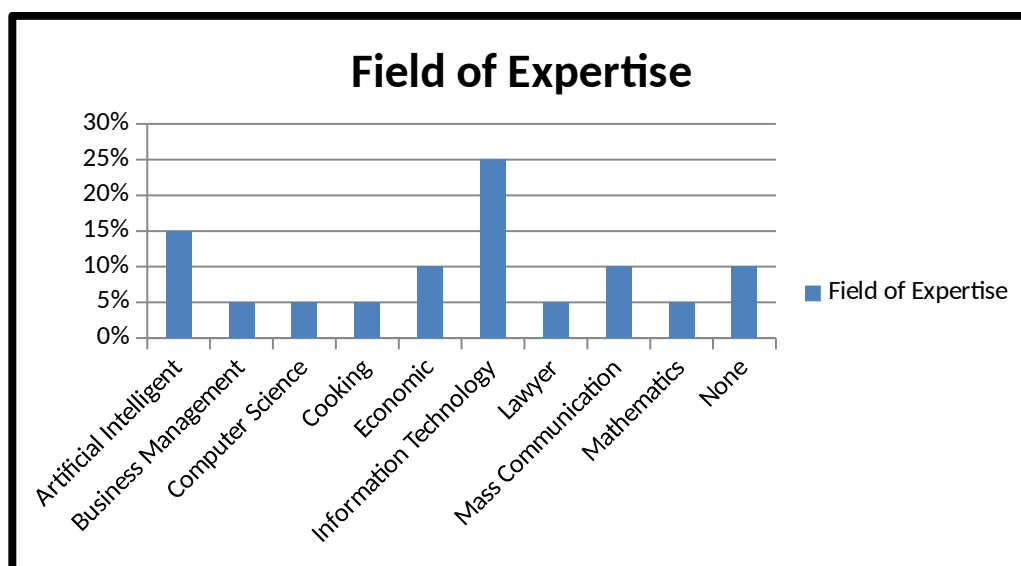


Figure 9

Justification: The question asked was meant to collect the data about the field of expertise of the users to study and classify them into different category of knowledge group. Different knowledge group of users tends to have different perception towards the same product.

Analysis: It was found from the result that majority of the users were involved in the field Information Technology. Hence most of the users have a better knowledge of IT products before using the application.

Impact: This will influence the design of the application in such a way the design of the system will be simple and easy to use even for a novice user as long the user has at least a basic knowledge of operating an IT product.

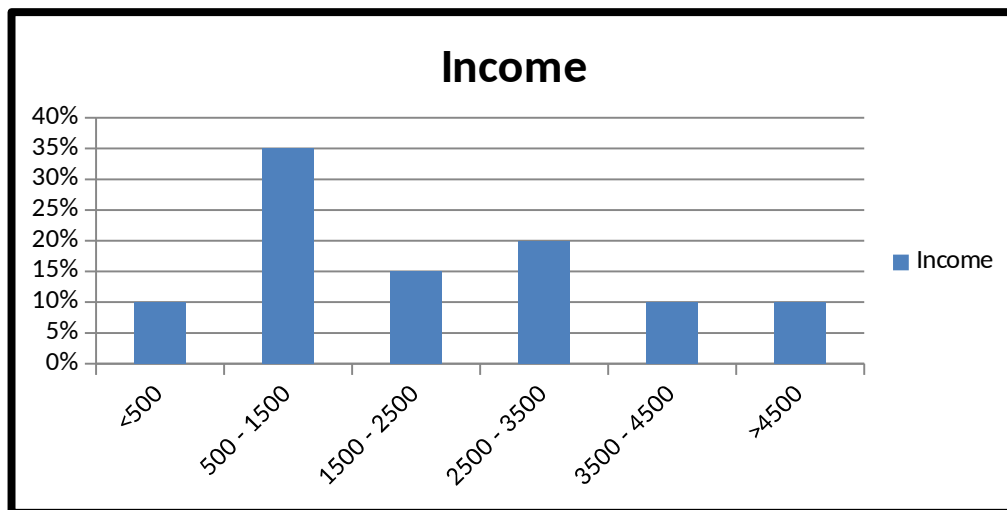


Figure 10

Justification: The question asked was meant to study the relationship between the percentage of different income groups of the users and the likelihood of using the application.

Analysis: Majority of the users which need this application are in the income range of 500-1500 which is about 35%, which is considered a middle-lower income group.

Impact: The percentage of the user in different income group will influence the usability of the application as different income group has different rate of interest in profit-gaining by using this application.

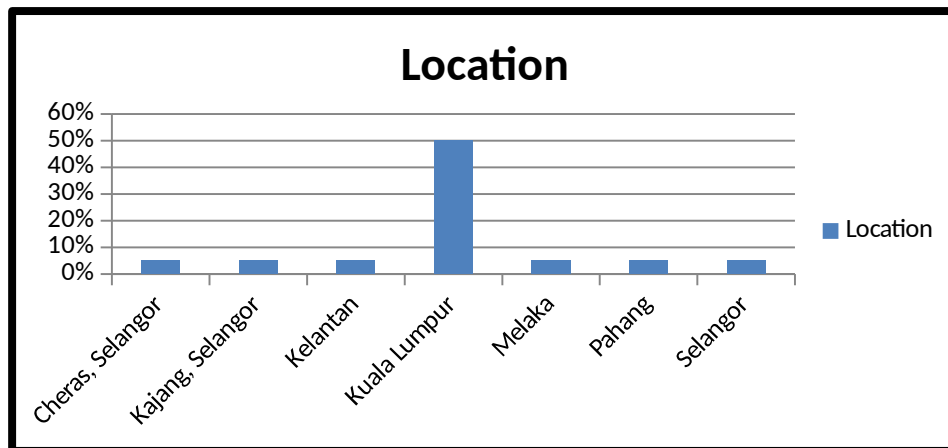


Figure 11

Justification: The question asked was meant to study the ratio of population of users in different locations. Users from different locations have different environment factor to be considered of.

Analysis: Most users are from Kuala Lumpur, which consist of half of the ratio from the result obtained. It can be concluded that most users have a better understanding of technology products as Kuala Lumpur is considered a city with latest technology.

Impact: The environment factor affects the way the user interacts with the application. The user will most likely interact with the applications by using similar approaches towards other similar technology products.

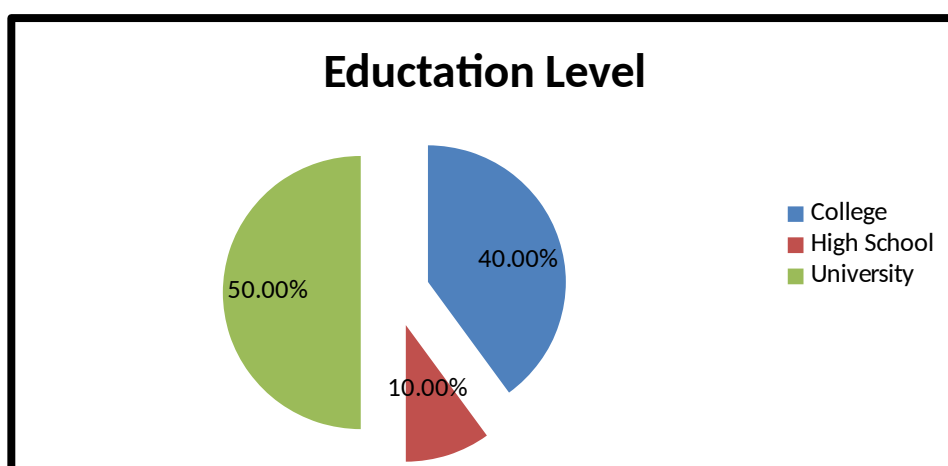


Figure 12

Justification: The question asked was meant to study the ratio of the users in terms of the highest education level the user had received. Users having different education level have different knowledge and understanding to apply in the way of using the application.

Analysis: Based on the result collected, half of the ratio of the users had received the highest education level of University, and 40% of the users had the highest education level of College. Only about 10% of the users had received the highest education level of High School. It can be concluded that most users are well educated.

Impact: The educational level of the users will result in different cognition abilities among the users. In such a way the users will have different familiarity towards the design of the application.

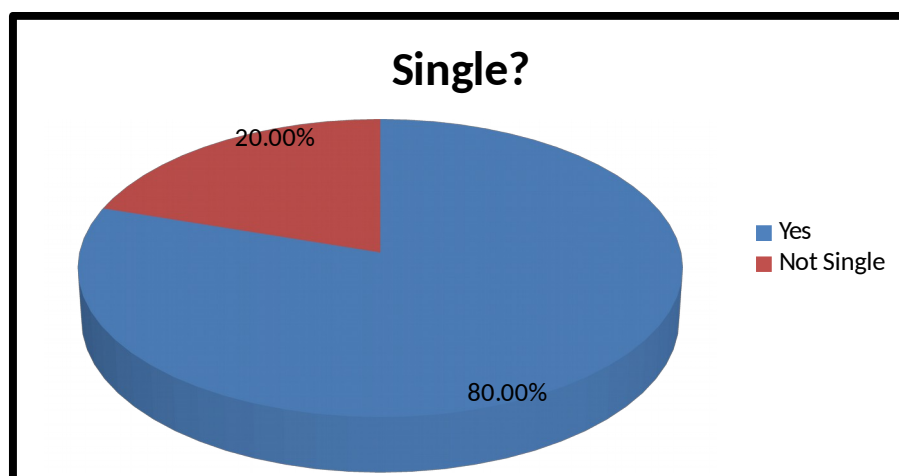


Figure 13

Justification: The question asked was meant to study the marital status of the user in relationship with the likelihood of using this application.

Analysis: Based on the result collected, surprisingly 80% of the users are single. The high ratio in single might be resulted from the impact of current economic status on the users, or other factors which will give an impact to the users in terms of living cost.

Impact: The Marital status of the user will influence the reliability of the application. In order to gain enough profit for the cost of living, the application will have reasonably successful prediction rate.

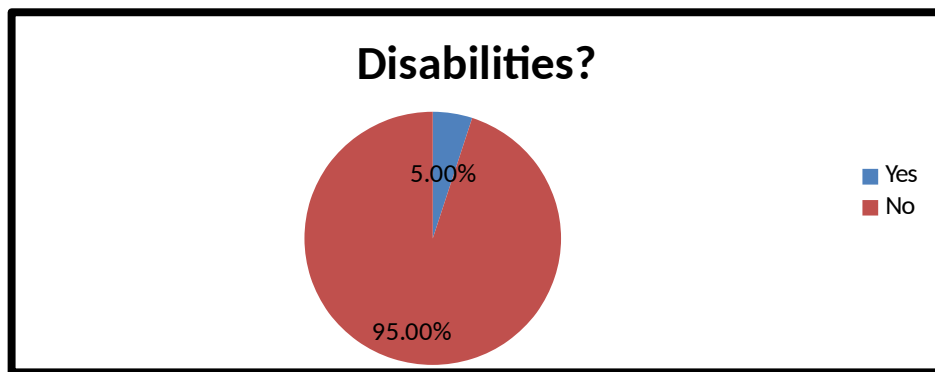


Figure 14

Justification: The question asked was meant to study the present of any disabilities on the users. Users who have disabilities will need extra features in the application feature and design for the usability factor.

Analysis: Based on the result collected, only 5% of the user has disabilities, which is quite minimal for the application to develop a design or feature specially for the specific users.

Impact: Since the ratio of user with disability is very small, the impact of user in terms of disability is negligible.

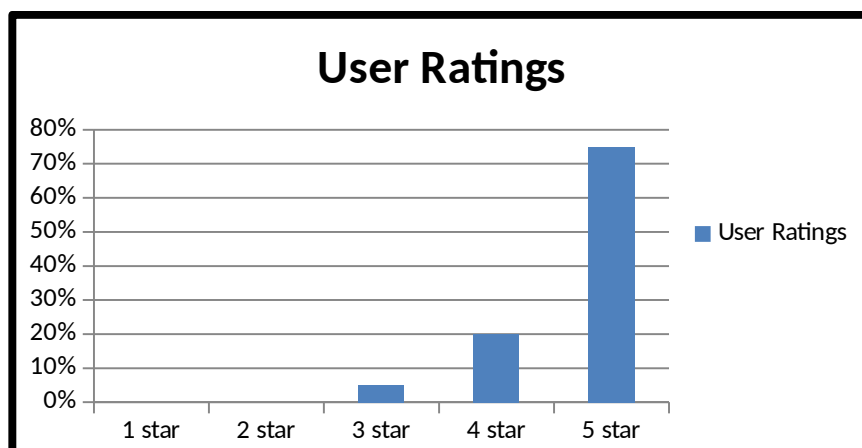


Figure 15

Justification: The question asked was meant to study the satisfaction of the users towards the application, which is being asked monthly for the consistency of data.

Analysis: Based on the result collected, 75% of the users rate a 5 star on the satisfaction level of the application, with 20% of the users rate a 4 star and 5% of the user rate a 3 star. Result had concluded that most users achieved high satisfaction level when using the application.

Impact: The user satisfaction level has a major impact on the application which can be in terms of usability such as the functions and features, or the design of the application as well as the practicality of the system.

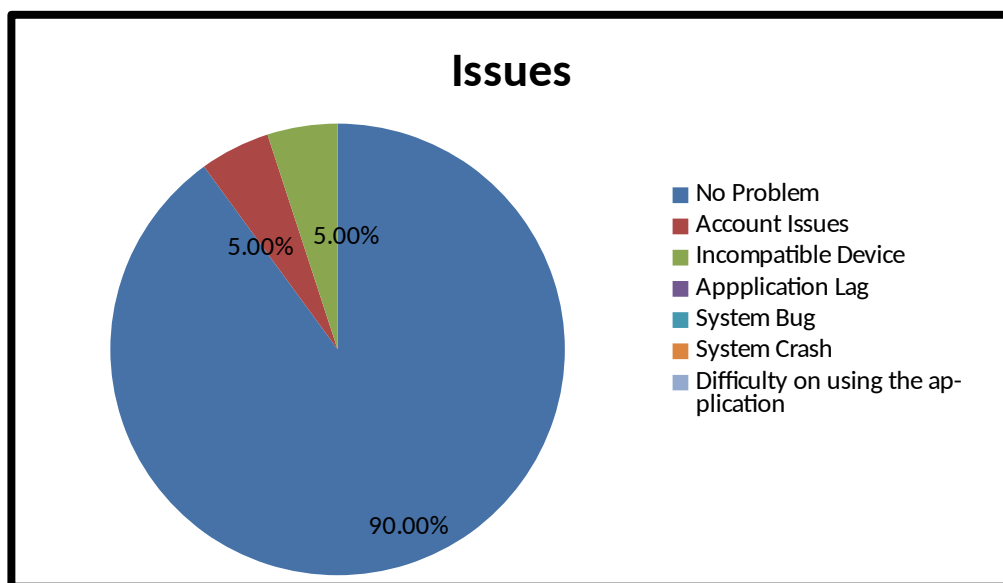


Figure 16

Justification: The question asked was meant to study the reason of the dissatisfaction of the user towards the application. Dissatisfaction arises mostly from the problem of the system itself such as bug issues.

Analysis: Based on the result collected, user shows dissatisfaction due to account issues and device incompatibility issues, which does not concern the system since it is the problem related to external sources. Besides, it is only consisting in total of 10% of the dissatisfy users which are quite minimal.

Impact: There is a need to research and study on the reasons of dissatisfaction of the users as the more dissatisfaction of the user shows towards the application, the more unlikely the user will use the application.

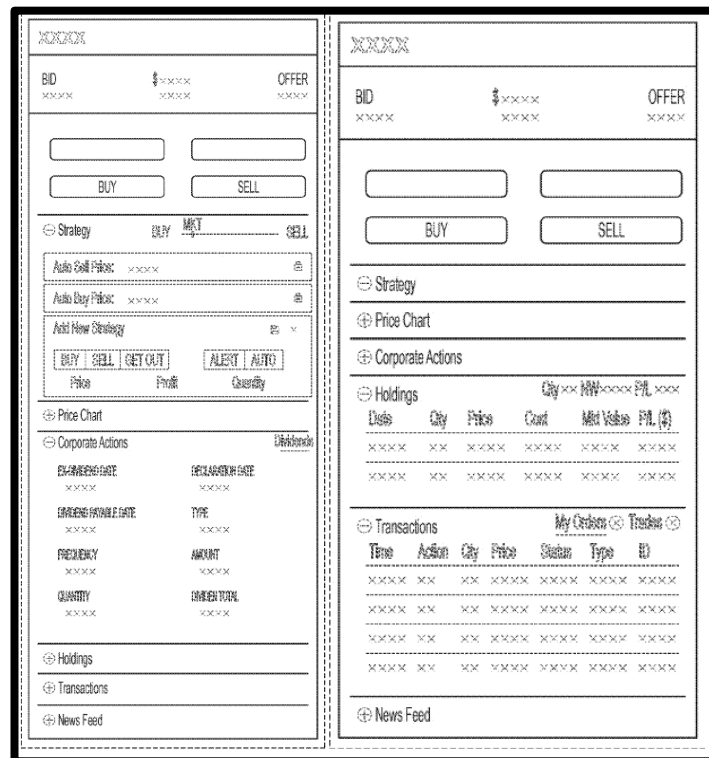


Figure 17

Justification: The document was studied as a reference for implementing the Graphical User Interface (GUI) to the system. GUI is an important factor for a user to use the system based on their preference and perception.

Analysis: Based on the document which developed a similar application, the GUI implemented in the application shows visibility towards the user by tidily grouping the functions under the major function titles with some important functions exist on the top of the page individually as the users will frequently access these major functions without a need to search it underneath.

Impact: GUI is an important feature which will influence the satisfaction level of the user in terms of preferences. A good GUI design will attract more users to use the system and vice versa.

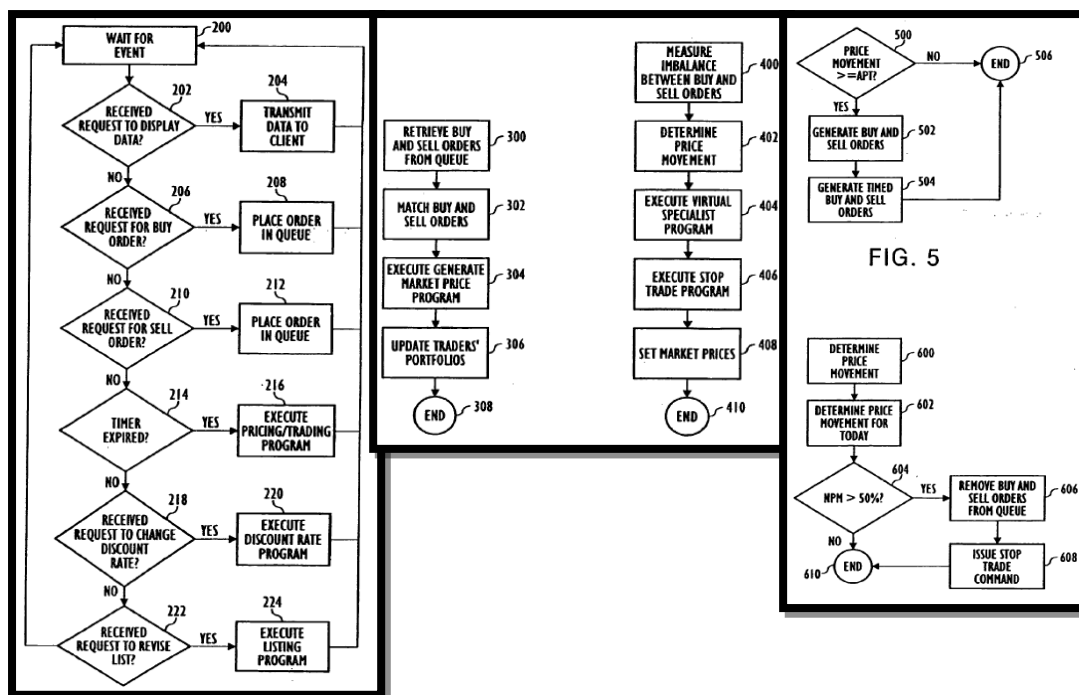


Figure 18

Justification: The document was studied as a reference for implementing the system of the online stock trading platform. The system was studied by on the flowcharts such as the events of the functions and the feedback mechanism.

Analysis: The document has clear and precise structure of the system mechanism as represented by the flow charts. The system mechanism mainly based on the feedback mechanism and mapping concept to develop a better human computer interaction.

Impact: A structural system is crucial to develop a concept by minimizing the errors and maximizing the quality of the system with a big picture. Flowchart is one of the methods which provide positive impact to the developer to create a structure for the system.

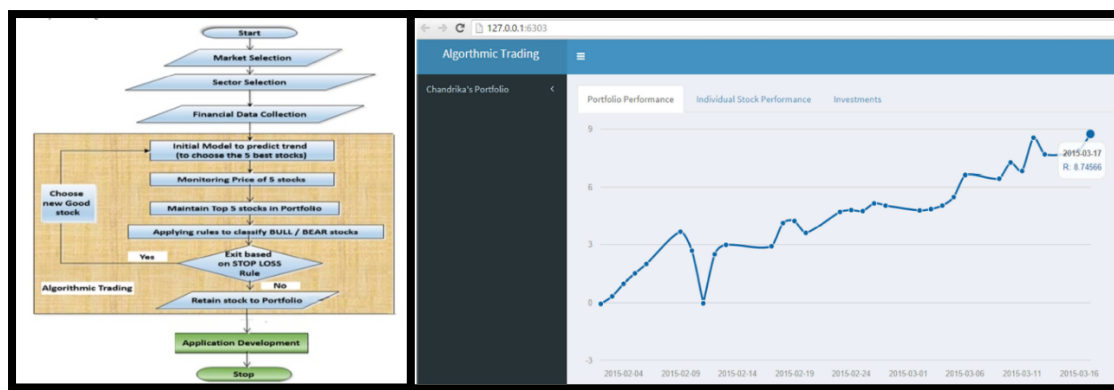


Figure 19

Justification: The document was studied as a reference for implementing analytic algorithm in the application, which uses data set that is stored over time to predict the outcome of the future.

Analysis: It was shown by the document an application which implement the analytic algorithm will provides more financial benefits to the users without the need for too much knowledge. However, the analytic algorithm is impossible to achieve perfect prediction as the future itself has a limited scale of predicted outcome. Hence, the analytic algorithm for trading is reliable only to a certain scale.

Impact: The involvement of analytic technology impacts the current stock trading market as the borderline of knowledge has been lower down. In other words, even a user without little to no knowledge about stock trading will have a sense of gaining or losing profit when he or she uses the stock trading application with analytic technology implemented inside the system.

1.3 User Profile Table & List of Requirement

User profiling table will aid in analyzing and identifying the information relevant to monitor the list of requirements to create the prototype.

1.3.1 User Profile Table

User	System Administrator
Age	25-40 years (Average 32 years)
Gender	50% male
Job Titles	IT System Administrator, Android System Administrator
Experience Level	2 years
Work Hours	40 hours per week; days and times depend on the company
Education	Associate degree or higher in related field
Location	Anywhere in Malaysia (Predominantly Peninsular Malaysia)
Income	RM900-RM12000/month; depends on experience and location (Average RM 4760/month)
Technology	Smartphone experience; high speed internet connection
Disability	No specific limitations
Family	Single or married

User	Customer Service
Age	18-40 years (Average 28 years)
Gender	50% male
Job Titles	Customer Service Representative
Experience Level	1 year
Work Hours	40 hours per week; days and times depend on the company
Education	High school diploma or equivalent
Location	Anywhere in Malaysia (Predominantly Peninsular Malaysia)
Income	RM400-RM5900/month; depends on experience and location (Average RM 2400/month)
Technology	Smartphone experience; high speed internet connection
Disability	No specific limitations
Family	Single or married

User	General Public
Age	18-60 years (Average 35 years)
Gender	45% male
Job Titles	No specific limitations
Experience Level	No specific limitations
Work Hours	No specific limitations
Education	No specific limitations
Location	Anywhere in Malaysia (Predominantly Peninsular Malaysia)
Income	No specific limitations
Technology	Smartphone experience; high speed internet connection
Disability	No specific limitations
Family	Single or married

1.3.2 List of Final Requirements

List of final requirements are the important analysed information to be used on later stages, such as creating a prototype.

1.3.2.1 System Administrator

- Create an account
- Login
- Forgot password
- Access to view system logs
- Applies operating system updates, patches, and configuration changes
- Modify user account information
- Troubleshooting any reported problems.
- System performance tuning.

1.3.2.2 Customer Service

- Create an account
- Login
- Forgot password
- Searching relevant content
- Navigate to customer service page
- View frequently asked questions (FAQ)
- Reply a question
- Post a thread

1.3.2.3 General Public

- Create an account
- Login
- Forgot password
- Searching relevant content
- Navigate to customer service page
- View frequently asked questions (FAQ)
- Submit a question

1.4 Task Analysis, Matrix & Impact

1.4.1 Task Analysis

Task Analysis is a presentation of task. In this case, Hierarchical Task Analysis Technique is used which can be either textual representation or graphical representation.

1.4.1.1 Hierarchical Task Analysis (textual representation)

1. Manage Stock Online
2. Register an Account
 - 2.1 Fill in the Personal Information
3. Login with an existing Account
 - 3.1 Fill in the Login Information
4. Access the Functions of the System
 - 4.1 View Portfolio

4.2 Configuration of Settings

4.2.1 Edit Profile Picture

4.2.1.1 Capture Profile Picture with Camera

4.2.1.2 Upload Profile Picture from Device Storage

4.2.2 Edit Credentials

4.2.2.1 Edit Name

4.2.2.2 Edit Email

4.2.2.3 Edit Contact Number

4.2.2.4 Edit Country

4.2.2.5 Edit Password

4.3 Access the Trading Center Features

4.3.1 Access and View Specific Stock

4.3.1.1 Configure the amount and percentage of stock

4.3.1.1.1 Buy Stock

4.3.1.1.2 Sell Stock

4.4 View Transaction History

4.5 View News

4.6 Access the Credits Features

4.6.1 Top Up Money

4.6.2 Withdraw Money

4.7 Access the Help and Feedback Features

4.7.1 View Help Feature for FAQ (Frequently Asked Questions)

4.7.2 Access Feedback Features

4.7.2.1 Submit a Feedback

5. Logout

Plan 0: Skip 1 for Registered User.

Plan 2: Do any of 3.1, 3.2, 3.3, 3.4, 3.5, 3.6, 3.7, before 4.

1.4.1.2 Task Matrix

Task Matrix will access to the usability and viability information towards the user in terms of Criticality, Difficulty, and Frequency when using the system.

	Criticalit y	Difficult y	Frequenc y
Manage Stock Online	H	M	H
Register an Account	H	L	L
- Fill in the Personal Information	H	L	L
Login with an existing Account	H	L	H
- Fill in the Login Information	H	L	H
Access the Functions of the System	H	L	H
- View Portfolio	M	L	M
- Configuration of Settings			
• Edit Profile Picture	L	L	L
▪ Capture Profile Picture with Camera	L	L	L
▪ Upload Profile Picture from Device Storage	L	L	L

• Edit Credentials	M	L	L
▪ Edit Name	M	L	L
▪ Edit Email	M	L	L
▪ Edit Contact Number	M	L	L
▪ Edit Country	M	L	L
▪ Edit Password	M	L	L
- Access the Trading Center Features	H	M	H
• Configure the amount and percentage of stock	H	M	H
▪ Buy Stock	H	M	H
▪ Sell Stock	H	M	H
- View Transaction History	H	L	M
- View News	H	L	M
- Access the Credits Features	H	L	H
• Top Up Money	H	L	H
• Withdraw Money	H	L	H
- Access the Help and Feedback Features	M	L	M
• View Help Feature for FAQ (Frequently Asked Questions)	H	L	M
• Access Feedback Features	H	L	M
▪ Submit a Feedback	H	L	M
Logout	H	L	H

H – High

M – Medium

L – Low

1.4.1.3 Task Impact

Some requirements that might have ‘emerged’ from carrying this Task Analysis:

- The need for the configuration of Privacy Settings, such as Ads, News and Notification.
- The need of filtering view result when viewing Transaction History.
- The need to view Notifications.

1.4.2 Refined Task Analysis

1.4.2.1 Hierarchical Task Analysis (textual representation)

1. Manage Stock Online
2. Register an Account
 - 1.1 Fill in the Personal Information
3. Login with an existing Account
 - 2.1 Fill in the Login Information
4. Access the Functions of the System
 - 3.1 View Portfolio
 - 3.2 Configuration of Settings
 - 3.2.1 Edit Profile Picture
 - 3.2.1.1 Capture Profile Picture with Camera
 - 3.2.1.2 Upload Profile Picture from Device Storage
 - 3.2.2 Edit Credentials
 - 3.2.2.1 Edit Name
 - 3.2.2.2 Edit Email
 - 3.2.2.3 Edit Contact Number
 - 3.2.2.4 Edit Country
 - 3.2.2.5 Edit Password
 - 3.2.3 Configure Privacy Settings
 - 3.2.3.1 Option Configuration on viewing Ads
 - 3.2.3.2 Option Configuration on News
 - 3.2.3.3 Option Configuration on Notifications
 - 3.3 Access the Trading Center Features
 - 3.3.1 Access and View Specific Stock
 - 3.3.1.1 Configure the amount and percentage of stock

3.3.1.1.1 Buy Stock

3.3.1.1.2 Sell Stock

3.4 View Transaction History

3.4.1 Filter View Result

3.5 View Notification

3.6 View News

3.7 Access the Wallet Features

3.7.1 Top Up Money

3.7.2 Withdraw Money

3.8 Access the Help and Feedback Features

3.8.1 View About Us Feature

3.8.2 View Help Feature for FAQ (Frequently Asked Questions)

3.8.3 Access Feedback Features

3.8.3.1 Submit a Feedback

4 Logout

Plan 0: Skip 1 for Registered User.

Plan 2: Do any of 3.1, 3.2, 3.3, 3.4, 3.5, 3.6, 3.7, 3.8, before 4.

1.4.2.2 Refined Task Matrix

Task Matrix will access to the usability and viability information towards the user in terms of Criticality, Difficulty, and Frequency when using the system.

	Criticalit y	Difficult y	Frequenc y
Manage Stock Online	H	M	H
Register an Account	H	L	L
- Fill in the Personal Information	H	L	L
Login with an existing Account	H	L	H
- Fill in the Login Information	H	L	H
Access the Functions of the System	H	L	H
- View Portfolio	M	L	M
- Configuration of Settings			
• Edit Profile Picture	L	L	L
▪ Capture Profile Picture with Camera	L	L	L
▪ Upload Profile Picture from Device Storage	L	L	L
• Edit Credentials	M	L	L
▪ Edit Name	M	L	L
▪ Edit Email	M	L	L
▪ Edit Contact Number	M	L	L
▪ Edit Country	M	L	L
▪ Edit Password	M	L	L
• Configure Privacy Settings	L	L	L
▪ Option Configuration on viewing Ads	L	L	L
▪ Option configuration on News	L	L	L
▪ Option configuration on Notification	L	L	L
- Access the Trading Center Features	H	M	H
• Configure the amount and percentage of stock	H	M	H
▪ Buy Stock	H	M	H
▪ Sell Stock	H	M	H
- View Transaction History	H	L	M
• Filter View Result	H	L	M

- View Notification	H	L	M
- View News	H	L	M
- Access the Wallet Features	H	L	H
• Top Up Money	H	L	H
• Withdraw Money	H	L	H
- Access the Help and Feedback Features	M	L	M
• View About Us Feature	L	L	L
• View Help Feature for FAQ (Frequently Asked Questions)	H	L	M
• Access Feedback Features	H	L	M
▪ Submit a Feedback	H	L	M
Logout	H	L	H

H – High

M – Medium

L – Low

1.4.2.3 Refined Task Impact

Some requirements that might have ‘emerged’ from carrying this Task Analysis:

- The need of including multiple accounts options upon withdrawing money or Top-up money.
- The need of categorizing the type of Ads.
- The need to include the icon of the companies.

2.0 Usability goals, guidelines and Competitive Analysis

2.1 Identifying Usability Goals & Design Principles Mapping with The Usability Goals

2.1.1 Learnability

First and foremost, the result collected had showed that the 20% of the respondents are beginner and not really understand how to use the mobile applications because of the mobile applications is not user-friendly to the new users. The is due to the UI of the applications will create confusion for the users as a lot of new users are learning by themselves when they are using any applications. So, the first usability goals that had been chosen is learnability. The benefit of implementing the usability goals is to increase the ease of use of the users, new users able to learn by themselves as the UI is designed in simple and clean that allow the user to understand certain functionality by reading the descriptions.

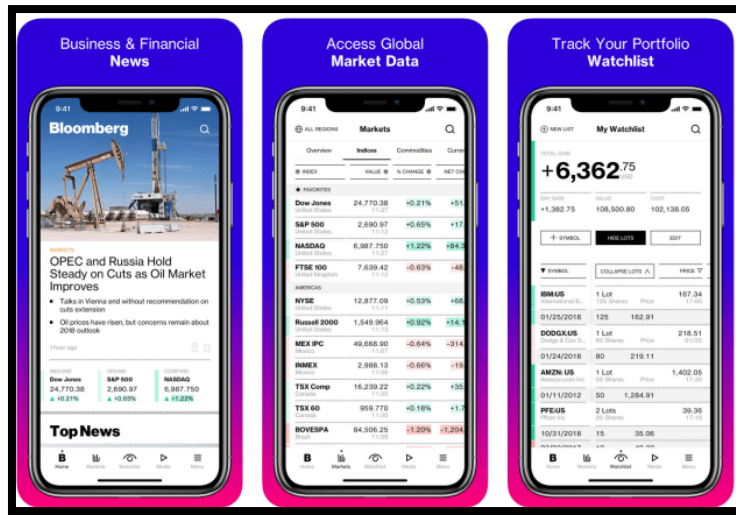


Figure 20: Visibility[CITATION Ken18 \l 1033]

The design principles that can associate with the learnability is visibility. The Visibility is very important role in Human-Computer Interaction because the mind is excellent at observing and clarifying clues in the world. It is required to have a balancing act of interaction design that invites actions and easily understood by peoples. Visibility of the good system will more likely users will know about the meaning of the icon and how to use them. Ideally, natural clues are made visible, not required conscious thought but putting excess things visible will result in lack of visible clues, so just select the right things that need to be visible to the users. Otherwise, two things that similar related or lack of visibility can cause false influence may lead to confusion and loss of control.

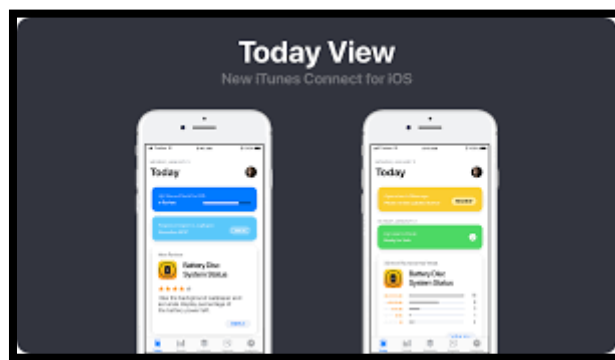


Figure 21: Consistency[CITATION Tha17 \l 1033]

On top of that, the second design principles that can apply with learnability is Consistency. Consistency limits the number of ways actions and operations are represented, ensuring that users do not have to learn new representations for each task. The new system will implement the more options button in all the tab that showed in the tab-bar menu. When the user clicks the link that direct user to another tab, then only the more options button will change to the back buttons that used to direct the user back to previous tab. All the functions that contain in

the more options button would be the same such as edit the settings of the application, edit the user profile, FAQ, Logout and so on.

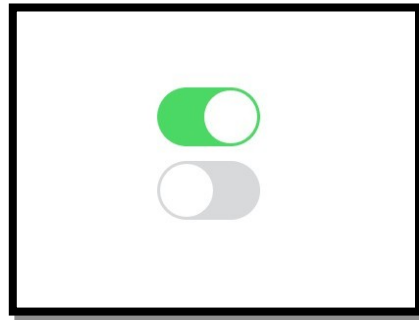


Figure 22: Feedback[CITATION jqu19 \l 1033]

In addition to that, the third design principles that can associate with learnability is Feedback. All systems require feedback to monitor and change behaviors. As humans are complex system, they require feedback from others to meet psychological and cognitive processing needs. When humans interacting with machines through user interface, feedback is required to let the humans know that their work is processing. As the figure above show the example of feedback, the button will change into green color when it is turned on and the button will change gray when it is turned off. The system should always keep users informed about what is going on inside the system as the user want the system to be in their control.

The design of the new UI will be adopting the tab-bar menus instead of hamburger side-bar is because the space to show things inside a mobile phone is very limited and design debate centered around the very principle of visibility. Nevertheless, hamburger menu provides a convenient place to store a variety of menu items in a mobile application, but it is lack of visibility of the contained menu items. This create disadvantages to the new users as they unable to access certain required functions directly and some of the functions will not be explored by the users that make those functions totally useless as the user unable to utilize the functions. The solutions for the user to get access to those main functions is putting the most required function into the tab-bar menus such as homepage that contain the every stock details after the user purchase, trending that show the type of the stock had increase in a graph, search that allow the users to search for the stocks, and other features like account setting will be putting in hamburger menu to increase the visibility of the users in main features.

2.1.2 Errors

On top of that, based on the analysis of the questionnaire had proved that 10% of the respondents are easy to make mistakes because of the errors contains in the system that give

the user in choosing the objective or specifying a method of achieving it whereas failure in carrying out an intended method for reaching an objective. The second usability goals that had been selected is errors. The errors refer to the prevention of the user to be in undesirable condition and situation when generate the intended outcomes. The pros of the errors are to help the user to avoid any unwanted action that stop the user from getting the results and reduce the internal error or design error that can possibly losing any property without the intention of the user.



Figure 23: Mapping[CITATION JIG20 \l 1033]

The design principles that can mapping with the errors is mapping. Mapping make the relationship between the actual action of the device and the action of the user obvious. Mapping leads to immediate understanding because it takes advantage of a close and natural relationship between control and function. A good mapping functionality of a system will be based on the behavior of the people and helping the users to understand how a system can be used and what actions are required to accomplish their goals. The mapping will take advantage of the commonly accept metaphor and use that as the basis for design decisions and it did create good result such as adjust the brightness of the phone by sliding up the brightness control.

The new UI will be applying the mapping to make the users able to understand what actions are required to achieve certain objective. The plus and min us signs will be perfectly mapped into the function of purchase or sell stock as the plus which is increase and minus which is decrease that both can be easily identified by the users as this reflect the way they know the concept of mathematic. The separation plus and minus button are more effective compared to the traditional way of putting buttons side by side with description which will create confusion to the users, or they might mislicked the button that result great loss of money.

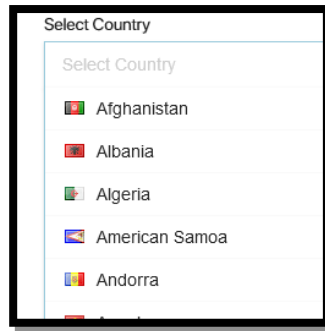


Figure 24: Errors[CITATION sta19 \l 1033]

Furthermore, the new UI will be associated with the errors is constraints to decrease the amount of errors that can possibly make by users. The constraints are an aspect of design that restricts user from performing some action. The constraint in the design sense limits the number of choices a user can choose to act upon. The new interface will be developed in a way that the user can only select from the list such as the user select their country from the list as the figure showed above. This will reduce the errors that can possibly make by the user instead of letting the user insert the country by themselves. It is important to give people constraints because it will eventually allow the users to follow the standards and insert the correct data.

Additionally, the new UI will be applied with the errors is affordances. The errors can be reduced using affordances because it allows people to know how to use it. The functions of the applications will be placed an icon with the descriptions. As human is a visual learner, the icon will allow the user quickly recognized what it is about and perform quick actions. If the user did not understand what the icon is about, they can read the descriptions instead of letting the user guess through trial or learn through error. This will significantly decrease the amount of error that make by user and eliminate the negative feelings from people's experiences.

2.1.3 Memorability

In addition to that, 10% of the respondents had given that the interface of the system is unable to remember certain function in the system even though the user has used the system once or many times due to the complex of the system. The third usability goals that have been chosen is memorability. The concept of memorability is a user can leave the program and when the user is return to it, the user able to remember how to do things in it. The advantages of memorability are allowing the brain of the user recognize some symbol, icon, or other visual presentation so that they know how to use the particular function even though they are not frequently using the program. Another advantage of the memorability is the user able to

quickly know where the particular controls in the system is and help user to achieve their objective or maintain productivity.

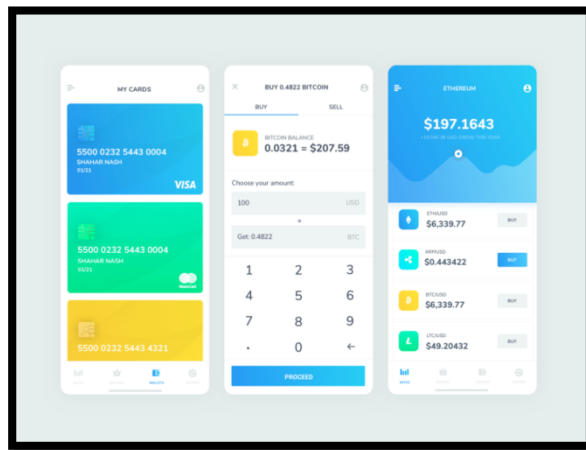


Figure 25: Consistency[CITATION Muz20 \l 1033]

The design principles that can associate with memorability is consistency. This is a fundamental principle that transcends throughout the world of design, consistency is the key factor. In interface design, all the elements, themes, animation and actions should remain similar through the entire experience. A consistent interface design allows the users can learn easily and navigate easily because the product is familiar by the user will helps to reduce learning time with the given experience. Therefore, implement consistency in every design of user interface will result in the ease of use, transfer of knowledge and a holistic positive to the users.

The new UI will be implemented consistency throughout the design scheme so that the users did not have to relearn things or learn different methods of doing things. All the elements such as color, layout and position, font, capitalization, terminology and language will all be consistent in the user interface. For example, the blue color that putting on every icon will remain the same in different pages as the images showed above. The search bar will be remained on the top of the pages that allow the user to allocate the search function quickly. The font and capitalization will be in same standards such as font size, font type, font style and each word will be capitalized. Lastly, the languages that will be used is English and standard abbreviations will be used to ensure the understanding of the users.

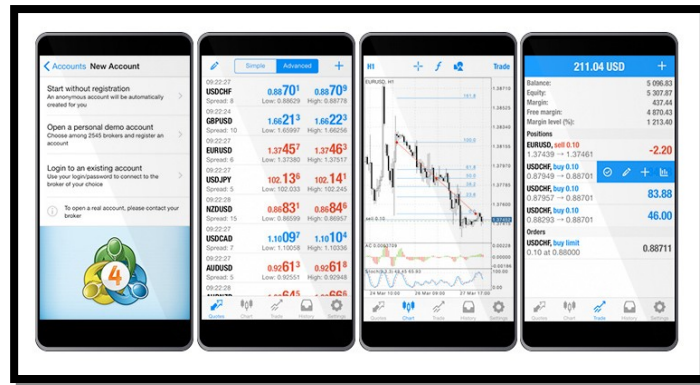


Figure 26: Visibility[CITATION And18 \l 1033]

Other than that, the new UI will be associated with memorability is visibility throughout the design scheme to allow the user has more visible on an element and the more likely users will know about them and how to use them. The main page will contain all the main functions such as any stock information, graphs, or any news will be showed to the user. This increase the visibility of the user as the key pieces of information visible will decrease the users' cognitive load and allow them to achieve the purpose of using applications. The tab-bar menu will also contain all the important tab that often used by the users such as home tab, news tab, wallet tab and settings tab. This allow the user quickly to remember about the functionality and what the tab is about.

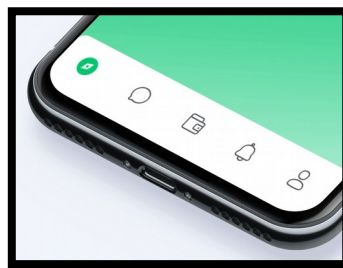


Figure 27: Affordances[CITATION Med18 \l 1033]

Besides that, the new UI will be applied with memorability is affordances. The affordances can be either perceived or a physical attribute. The new UI will be implemented different icon to represent different tab or functions that allow the user quickly memorized what is the purpose of that tab or functions as the figure showed above. The icons that will be used will be similar as the icon that used in social media which give clues to the users on how it is used. This will ensure that the user is not guessing through trial and error to know understand the architectural of the interface. This will take up time and effort on the user's part.

2.2 Competitive Analysis

2.2.1 IQ Option

Usability Goals	Strategies and guidelines used	Descriptions
Learnability	<ul style="list-style-type: none">Consistency	<ul style="list-style-type: none">The save button, execution button and additional settings will be located at the top right corner of the applications.The back button and close button will be on the top left corner of the applications.Any buttons that indicate dangers will all in red color such as sell stock and any button that required caution will all in green color such as buy stocks.
	<ul style="list-style-type: none">Feedback	<ul style="list-style-type: none">Any profile that had been edited by the user, the save button will change from dark grey color to white color.The icon in the tab-menu bar will be light up once the user clicked to indicate user on which tab.Any execution button that had been clicked will change the color to dark grey.All the settings that have been turned on, the buttons will be in green color and the settings that have been turned off, the buttons color will be same as the background color.
	<ul style="list-style-type: none">Visibility	<ul style="list-style-type: none">All the important tabs will be putting in the tab bar menu which increase the visibility of the users.The account and application setting will be combined into one tab and the user able to find all the settings in “Account” tab.The important functions such as graph, stocks information, buy stocks and sell stocks are placed in the main tab.
Errors	<ul style="list-style-type: none">Mapping	<ul style="list-style-type: none">The sell stocks button is located at the bottom left side and the buy stocks button is located at the bottom right side which the sell stocks button indicates minus and the buy stocks button indicate plus.The tab goes down when the user slides up and the tab goes up when the user slides down.
	<ul style="list-style-type: none">Constraints	<ul style="list-style-type: none">The birth date, gender and country can only be selected from the list instead of inserting by users.

		<ul style="list-style-type: none"> • All the assets that have been showed inside the application can only be chosen by the users • The scroll bar on the right side that hit the bottom which the tab will not go beyond that.
	<ul style="list-style-type: none"> • Affordance 	<ul style="list-style-type: none"> • The close button in the applications is a X cross that show possible actions to close something. • The labels are putting in every function to make the functions clear to users. • The metaphors in form of image had been used to indicate meaning in every setting.
Memorability	<ul style="list-style-type: none"> • Consistency 	<ul style="list-style-type: none"> • Every close and back button are located on the top left of the screen that allow user to remember. • Every save button and execution buttons are located on the top right of the screen that able to recognize by user more easily. • The tab-bar menu located at the bottom of the screen that allow user switch tab that will increase the memorability of the user.
	<ul style="list-style-type: none"> • Visibility 	<ul style="list-style-type: none"> • The tab-bar menu that contain all the important tabs that are frequently used by users and it create the ease of use for users. • The most importance elements are buying stocks and selling stocks which are putting at the main tab to prioritize the visibility of the user. • The settings of the application that are less use by the user will be putting in the hamburger menu to increase the visibility of the interface.
	<ul style="list-style-type: none"> • Affordances 	<ul style="list-style-type: none"> • The back button with the reverse icon is used to indicate back to previous tab or pages. • The close button will be replaced as the X cross to indicate close the current tab. • All the settings and details of the application are using icon to show certain information to the users such as privacy and security is using the “Lock” icon, settings are using the “Gear” icon, payments are using the “Credit Card” icon and so on.

2.2.2 FxPro

Usability Goals	Strategies and guidelines used	Descriptions
Learnability	<ul style="list-style-type: none"> Consistency 	<ul style="list-style-type: none"> The back button in the applications is located at the top left of the screen. The minimize button in the applications is located at the top right of the screen. Any button that indicate danger will all in red color such as deposit money and other button will be in blue color.
	<ul style="list-style-type: none"> Feedback 	<ul style="list-style-type: none"> Any profile settings that are invalid, an error message will be showed to the users. The icon of the tab bar menu will be lightened up from dark grey to red color which indicate the users on which tab. All the settings of the applications such as night mode and notification will be using toggle button when the toggle buttons turned on, it will turn green while toggle buttons turned off, it will turn white.
	<ul style="list-style-type: none"> Visibility 	<ul style="list-style-type: none"> All the tabs that are important will putting in the tab bar menu which increase the visibility of the users. The settings of the applications will be combined into one and the user able to find all the settings in the “Settings” tab. The important functions such as display of stocks information, buy stocks and sell stocks are placed in the main tab.
Errors	<ul style="list-style-type: none"> Mapping 	<ul style="list-style-type: none"> Every major with the buy stocks button that indicate increase is located on the right side of the screen and the sell button that indicates decrease is located at the middle of the screen in every line. The tab will go down when the user slides up and the tab will go up when the slides up.
	<ul style="list-style-type: none"> Constraints 	<ul style="list-style-type: none"> The use of the applications required the user submit the photo of their identity card or passport to verify their age is above 18. The scroll button will reach the bottom of the screen once the user reached the end and the scroll button will reach the top once the use reached the top of the screen. The user can only trade any major that showed in the list which other major that out of the list is not supported.
	<ul style="list-style-type: none"> Affordances 	<ul style="list-style-type: none"> The “<” icon is placed before the “back” word to make the user understanding the function is back to previous tab.

		<ul style="list-style-type: none"> • The filtering of majors in calendar allow the user to tick particular major once the user tick, there will be a green circle with the tick inside beside the major to indicate the particular major had been selected. • The country flag is placed beside each language when the user selects their prefer language in the application which allow the user quickly to allocate their language.
Memorability	<ul style="list-style-type: none"> • Consistency 	<ul style="list-style-type: none"> • Every apply or save buttons are located at the bottom of the screen in every tab which can increase the memorability of the users. • The back buttons are located at the top left of the screen in every tab which allow the user to memorize it and perform quick action. • The tab bar menu located at the bottom of the screen for every tab which allow user to switch tab easily.
	<ul style="list-style-type: none"> • Visibility 	<ul style="list-style-type: none"> • The tab bar menu consists of all the functions that frequently used by the users in stock trading. • The important elements such as buy stocks, sell stocks and check major are placed in the main tab which make the user remember the main function of the applications. • All the additional settings are combined into one and the user able to edit any settings in the “Settings” tab which allow the user to find it easily.
	<ul style="list-style-type: none"> • Affordances 	<ul style="list-style-type: none"> • The “<” icon is placed before the “back” word to allow the user to understand that is return to the previous page. • The tab bar menu is consisting of different icon which represent each of those tabs such as placing “wallet” icon to represent the “Wallet” tab, placing “gear” icon to represent the “Settings” tab and so on. • The “>” icon will be placed at the right side of every line to indicate the elements has a new tab that can direct the user to that tab once the user clicked.

2.2.3 Top1 Markets

Usability Goals	Strategies and guidelines used	Descriptions
Learnability	<ul style="list-style-type: none"> Consistency 	<ul style="list-style-type: none"> The back button in the applications is located at the top left of the screen. The more options and save button in the applications is located at the top right of the screen. Any button that contain different function will be putting in either black or white color such as deposit money and trending now.
	<ul style="list-style-type: none"> Feedback 	<ul style="list-style-type: none"> Any invalid profile settings inserted by the users, an error message will be showed to the users. The icon of the tab bar menu will be lightened up from dark blue to white color which indicate the users on which tab. All the settings of the applications that required selection will putting “>” icon to let the user know they need to click in to make selection.
	<ul style="list-style-type: none"> Visibility 	<ul style="list-style-type: none"> All the tabs that are important will putting in the tab bar menu which increase the visibility of the users. The additional settings of the applications will be put in three vertical dots which is more options button. The important functions such as different stock information will be showing line by line that allow the user to view it clearly.
Errors	<ul style="list-style-type: none"> Mapping 	<ul style="list-style-type: none"> Every forex trading with the buy button that indicate increase is located on the right side of the screen and the sell button that indicates decrease is located at the left side of the screen. The tab will go down when the user slides up and the tab will go up when the slides up.
	<ul style="list-style-type: none"> Constraints 	<ul style="list-style-type: none"> The use of the applications required the user to verify the email address and phone number. The scroll button will reach the bottom of the screen once the user reached the end and the scroll button will reach the top once the use reached the top of the screen. The user can only trade any forex that showed in the list which other forex that out of the list is not supported.
	<ul style="list-style-type: none"> Affordances 	<ul style="list-style-type: none"> The “<” icon is placed to make the user understanding the function is back to previous tab.

		<ul style="list-style-type: none"> • Every design of the button is rectangle with a different color to indicate that is button and it is clickable. • The search field with a search icon and text prompt to giving instructions is on top of the screen to allow the user input necessary data.
Memorability	<ul style="list-style-type: none"> • Consistency 	<ul style="list-style-type: none"> • Every next or confirm buttons are located at the bottom of the screen in every tab which can increase the memorability of the users. • The back buttons are located at the top left of the screen in every tab which allow the user to memorize it and perform quick action. • The tab bar menu located at the bottom of the screen for every tab which allow user to switch tab easily.
	<ul style="list-style-type: none"> • Visibility 	<ul style="list-style-type: none"> • The tab bar menu consists of all the functions that frequently used by the users. • The important elements such as buy stocks, sell stocks and check forex are placed in the home tab which make the user remember the main function of the applications. • All the additional settings or information are combined into three vertical dots which is more options that allow the user easily gained information of edit any settings.
	<ul style="list-style-type: none"> • Affordances 	<ul style="list-style-type: none"> • The “<” icon is placed on the top left of the screen to allow the user to understand that is return to the previous page. • The tab bar menu is consisting of different icon which represent each of those tabs such as placing “house” as the home page, “wallet” as the asset and so on. • The “>” icon will be placed at the right side of the line to indicate the elements has a new tab that can direct the user to that tab once the user clicked.

2.2.4 Conclusion of Competitive Analysis

Usability Goals	IQ Option	FxPro	Top1 Markets	Proposed System
Learnability	<ul style="list-style-type: none"> The save button, execution button and additional settings will be located at the top right corner of the applications. Any profile that had been edited by the user, the save button will change from dark grey color to white color. The crucial elements such as graph, stocks information, purchase stocks and sell stocks are placed in the main tab. 	<ul style="list-style-type: none"> The save button in the applications is located at the bottom of the screen. Any profile settings that are invalid, an error message will be showed to the users. The important functions such as display of stocks information, purchase stocks and sell stocks are placed in the main tab. 	<ul style="list-style-type: none"> The more options and save button in the applications is located at the top right of the screen. Any invalid profile settings inserted by the users, an error message will be showed to the users. The essential functions such as different stock information will be placing in the main tab and showing line by line that allow the user to view it clearly. 	<ul style="list-style-type: none"> The more options button is located at the top left of the application and the save button is located at the bottom of the applications. The error message with red colour will be showed once the user entered the wrong format or information. All the stocks information that had been purchased by the user will be showed in the home tab.
Errors	<ul style="list-style-type: none"> The sell stocks button is located at the bottom left side and the buy stocks 	<ul style="list-style-type: none"> Every major with the buy stocks button that indicate increase is 	<ul style="list-style-type: none"> Every forex trading with the buy button that indicate increase is 	<ul style="list-style-type: none"> The “+” icon will be used to inform the button is for purchasing

	<p>button is located at the bottom right side which the sell stocks button indicates minus stocks and the buy stocks button indicate plus stocks.</p> <ul style="list-style-type: none"> • The birth date, gender and country can only be selected from the list instead of inserting by users. • The close button in the applications is a “X” cross that show possible actions to close something. 	<p>located on the right side of the screen and the sell button that indicates decrease is located at the middle of the screen in every line.</p> <ul style="list-style-type: none"> • The use of the applications required the user submit the photo of their identity card or passport to verify their age is above 18. • The “<” icon is placed before the “back” word to make the user understanding the function is back to previous tab. 	<p>located on the right side of the screen and the sell button that indicates decrease is located at the left side of the screen.</p> <ul style="list-style-type: none"> • The use of the applications required the user to verify the email address and phone number. • The “<” icon is placed to make the user understanding the function is back to previous tab. 	<p>stocks and “-” icon is used to indicate the button is for selling stocks.</p> <ul style="list-style-type: none"> • The gender can only be selected from the list for the registered user or new register user to avoid errors. • The “←” icon will be used to indicate back to previous page and placed in the top right of the screen.
Memorability	<ul style="list-style-type: none"> • Every close and back button are located at the top left of the screen that allow user to remember. • The most importance elements are buying stocks and selling stocks which are putting at the main tab to increase the memorability of the user. • The close button is replaced as “X” in every tab that is located at the 	<ul style="list-style-type: none"> • Every apply or save buttons are located at the bottom of the screen in every tab which can increase the memorability of the users. • All the additional settings are combined into one and the user able to find any settings in the “Settings” tab. • The same “<” icon is placed before the “back” 	<ul style="list-style-type: none"> • Every next or confirm buttons are located at the bottom of the screen in every tab which can increase the memorability of the users. • The tab bar menu consists of all the tabs that frequently used by the users. • The same “>” icon will be placed at the right side of the settings to 	<ul style="list-style-type: none"> • The more options button will be located at the top right of the screen which allow the user get access to others tab more quickly. • The important tabs such as Trading Center, Transaction History, News and Wallet will be store in the more option button to increase the visibility by not implementing the tab-

	top right of the screen.	word in every tab is located at the top left of the screen.	indicate there are more settings inside.	bar menu. <ul style="list-style-type: none"> • The same “←” icon to indicate back to previous tab will be placed at the top right of the screen in every tab.
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2.3 The impact towards the competitive analysis activities

First and foremost, the competitive analysis will have a better idea and understanding of the market conditions. This will provide the information on what the customer needs as the customer is the priorities that need to be concern first. The developed product must address and meet what the customer desire and expectation which will attract the new customers and make the customers remain using the product. This will allow the product holds a commanding position in the core market.

On top of that, one of the impacts towards the competitive analysis activities is understanding the market gaps. The competitive analysis will allow strategic planners to develop matrixes for identifying unserved or underserved gaps in the market. This analysis will show all the potential competitors according to their unique services models and identify where the competitors focusing on based on extreme ranging from high price to low price, high quality to low quality and high customization to low customization.

In addition to that, market trends are listed as one of the impacts towards the competitive analysis activities. Competitive analysis is able to expose broad trends in the marketplace. This will provide a golden opportunity to show the differences in the product and services compare to other competitors. This can allow the product to stand out of the crowd and make the product consists of special things that could not be found in similar products.

3.0 Design & Prototype

3.1 Parallel Design

3.1.1 Loo Chee Hin – Sketch 1

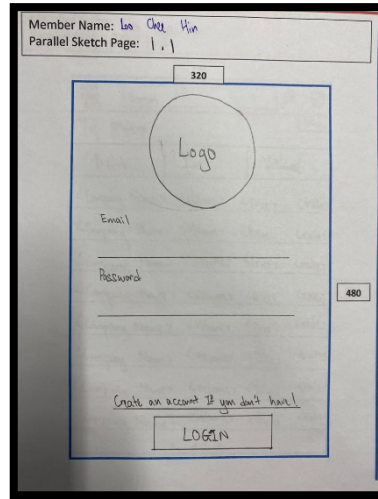


Figure 28 Parallel Sketch Page 1.1

Reviewer	Description
Andrew Chung Hui Yue	The design able to spread the right message to users that allow the user quickly to identify it is the login page. The forms consist of fields, boxes and buttons are arranged in the correct way that allows user to enter their data in the correct field and boxes.
Yeo Khang Hsien	The design is simple but precise in terms of the relevant and important functions such as the email and password as the login credentials with a login button. Moreover, the underlined message redirects the user to the registration page which differentiates the login button for the user to not be confused.
Low Yang Man	The design can the user easily review on the email and password with login button. The user could direct to registered as a member if the user wanted to create an account.

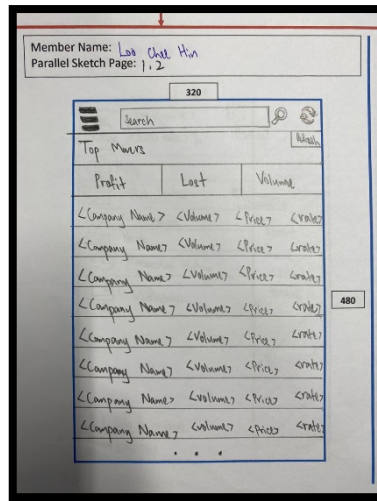


Figure 29 Parallel Sketch Page 1.2

Reviewer	Description
Andrew Chung Hui Yue	The objective is quite clear for this page which used to show all the different types of forex, volume, price, and rate. The search box also provided to allow the user to search any forex easily without scrolling down to find the particular forex.
Yeo Khang Hsien	The user is able to view the overall information with ease as the raw information has been categorized in the form of table with appropriate attributes on the rows and columns. The search box is a convenient tool for the user to search for a specific forex or multiple forex which shares a common attribute.
Low Yang Man	The user can give simple review in the information of the company that the user has the easier way to view in row and columns.

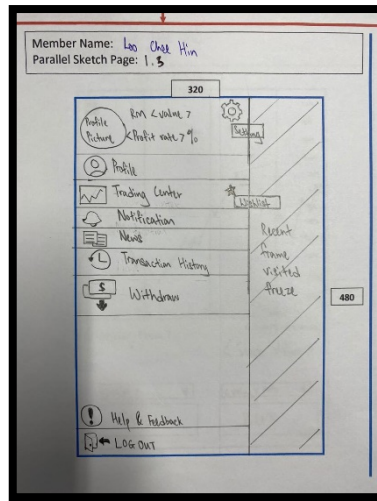


Figure 30 Parallel Sketch Page 1.3

Reviewer	Description
Andrew Chung Hui Yue	All the font sizes for different options and settings are consistent and clear which can easily read by the users. Different icons have used for different options and settings. The used of icon allow the users to understand the option by looking at the icon instead of reading the descriptions.
Yeo Khang Hsien	The icons used in the design are easy to understand the meaning. Moreover, the icons are neatly aligned at the left direction menu which can be swiped out to be accessed. Some space is intentionally created at the menu with the purpose of easier view of logout button for the user.
Low Yang Man	The icons have giving the clear information for the user to manage the menu easily. However, the icons have the clear information with different icons to allow the user to swipe out the icon that help the user easier addressed. The icon menu can easier view the help and feedback button for user.

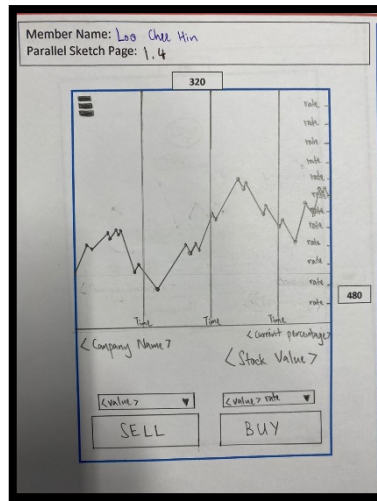


Figure 31 Parallel Sketch Page 1.4

Reviewer	Description
Andrew Chung Hui Yue	The hamburger menu is implemented to hide the traditional file menu until it is clicked. The hamburger menu is suitable in this design because it takes up a small amount of space in the screen which allows the user to view the graphs in a much larger screen compared to the type menu that constantly sticks on one part of the screen.
Yeo Khang Hsien	The menu icon with 3 horizontal lines or so-called hamburger menu is suitable for hiding unnecessary items from sight as these items will block the view of the graph.
Low Yang Man	The menu icon can view the suitable stock value that help the user review the rate with making right decision to buy or sell.

3.1.2 Yeo Khnag Hsien – Sktech 2

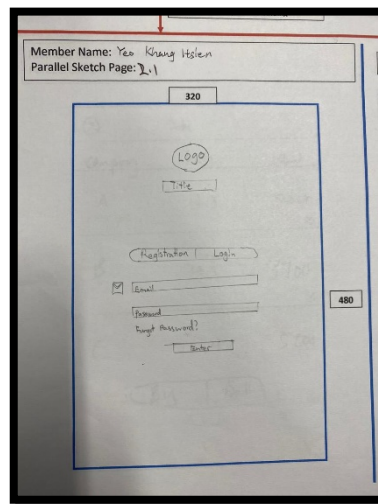


Figure 32 Parallel Sketch Page 2.1

Reviewer	Description
Andrew Chung Hui Yue	The design of the page can directly let the user know it is a login page as the title is placed under the logo. The concept of the form is creative because it allows the user to choose either register or login on the same page. The fields are filled with the comment which allows the user to understand what data should be inserted in the particular field.
Loo Chee Hin	The design is using the concept of simplicity which place the login field for email and password under the logo. The email icon is placed for indicating the field that's required email input. The selection of register or login is placed on top of the input field and it act as initial selection of option. The forgot password is properly arranged before the login button.
Low Yang Man	The design of the login page can give the clear information with register and login. The login and register can give easier defined to the user to need to register and login. The design can help the user to remember the password by retype the password before the login.

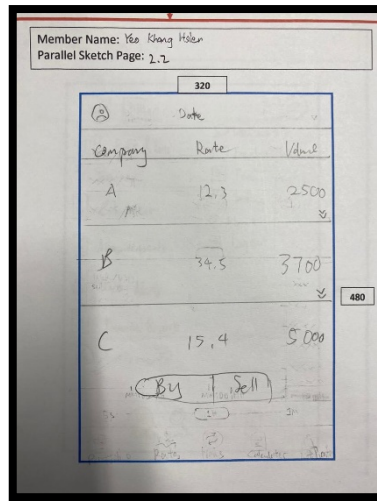


Figure 33 Parallel Sketch Page 2.2

Reviewer	Description
Andrew Chung Hui Yue	All the company information, rate, and value will be showing in line by line. This allows the user quickly to allocate the information of the company due to the good arrangement of a different company. The button in the pages is easy to be distinguished because of the round shape design that is frequently used by social media.
Loo Chee Hin	The basic details of each stock are already listed down by row. This purpose is to make user easy to look on the important thing when doing the function of Buy or Sell. The buttons are at the bottom, so it is like a sequence look first then decide to buy or sell at the end.
Low Yang Man	The function allowed the user to view and select the company name which the user wanted to buy or sell. The function can be defined easier with the company name, rate and currency by giving an easy management on the function.

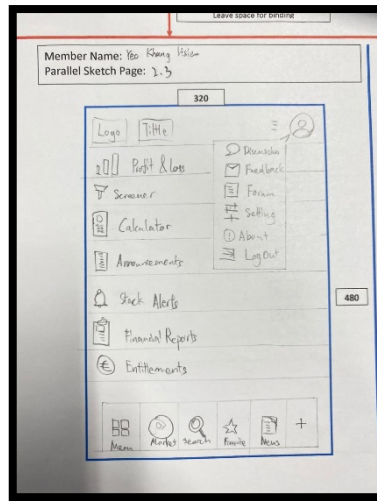


Figure 34 Parallel Sketch Page 2.3

Reviewer	Description
Andrew Chung Hui Yue	The functions are showing in line by line which allows the user to view and select which functions they want. The settings of the applications will be stored in the hamburger menu to reduce the complexity of the main page. The footer navigation menu will allow the quick tool to allow the user access to certain features.
Loo Chee Hin	The functionalities of the application are arranged in by row which is visible to user and select the option as they are required. The style of listing is using hamburger menu to reduce the use of complexity. The footer navigation allow user to work fast by selecting one of the functions.
Low Yang Man	The menu button is giving good interface design which allows the user to have clear information to view and select the menu icon easily. The functions are easily to manage by the user.

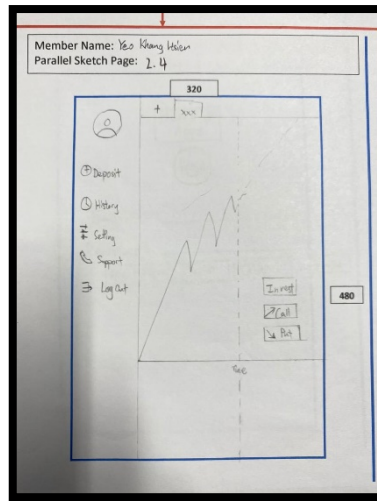


Figure 35 Parallel Sketch Page 2.4

Reviewer	Description
Andrew Chung Hui Yue	The horizontal navigation menu on the left side of the screen contains the options but the navigation menu is large which will affect the visibility of the user. The button that placed inside the graph is not suitable in case the user needs to view the history of the forex and the button will be interference to the user. This can be eliminated by increasing the invisibility of the button when the user scrolls back to view history.
Loo Chee Hin	The vertical selection option on the left side is convenient for user to pick the option. The concept of the forex is to make the graph more dynamic so when the user decides to invest or call, it can be easily to access.
Low Yang Man	The navigation menu allowed the user to give the clear information about visibility the navigation menu easily. The user allowed to the check the information on what to invest or buy by checking the navigation menu

3.1.3 Low Yang Man – Sketch 3

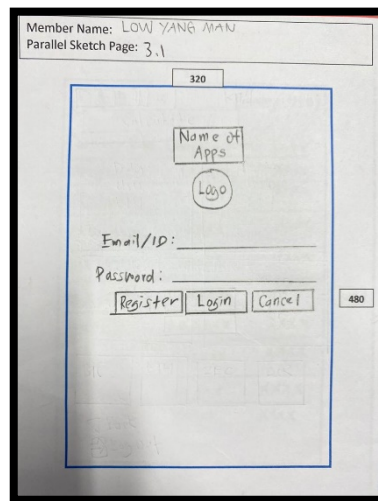


Figure 36 Parallel Sketch Page 3.1

Reviewer	Description
Andrew Chung Hui Yue	The design of the page can allow the user to notice the line of email and password in the form that is used to insert their details. There will also consist of the different buttons such as register, login and cancel which allow the user access to other actions apart from login as the design of the page is to allow the user to have multiple functions on a single page.
Loo Chee Hin	The design is following the trend of simplicity. Below of the logo has a big field of user input for email and password. Below of the fields have the buttons for doing login and register. Just the cancel button is unnecessary for putting into the page because it do not show the function for user access.
Yeo Khang Hsien	The design is simple to be access. However, the user might have some issues such as wrongly pressing the buttons as the distance between the buttons are too near. Moreover, the user might be confused whether the page is a login page or registration page from their similarities.

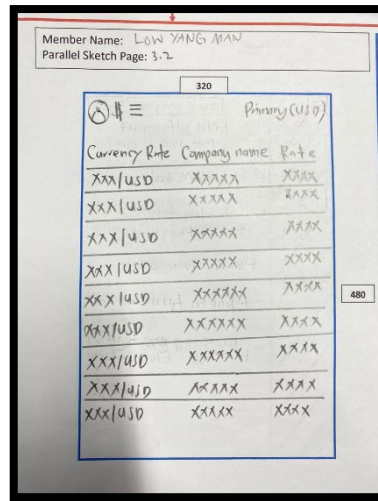


Figure 37 Parallel Sketch Page 3.2

Reviewer	Description
Andrew Chung Hui Yue	The sketch consists of some features that will have a positive impact on the users. All the information about the company and rate will be showing in line by line. However, it has one more feature which allows the user to select the currency and it will automatically convert it to the currency selected by the user. This will really increase the impression of the users.
Loo Chee Hin	The list of the companies is shows in rows with the details of company rate, company name and stock rate. It is showing the most important information for the user. But it just a display and does not have any function to do with it because the absent of functionable buttons. The currency is efficiently to display for user to understand the current market value.
Yeo Khang Hsien	The design has the upside of having a clear sight of columns for the user to view. An enhancement to this design will be a filter feature with the purpose of viewing specific information.

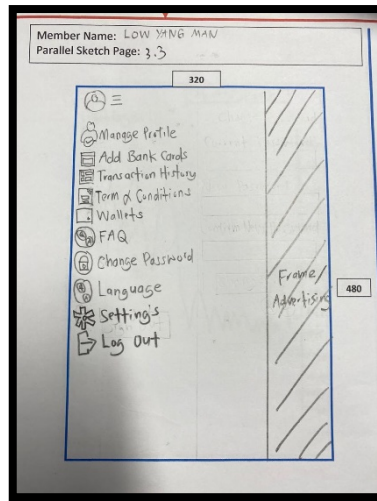


Figure 38 Parallel Sketch Page 3.3

Reviewer	Description
Andrew Chung Hui Yue	The hamburger menu will be hidden all the navigation features which allow the user to have larger screen space, but it will be less discoverable than visible or partially visible navigation. The user will not able to perform any quick actions compared to other navigation menus that always stick on one side of the screen.
Loo Chee Hin	The list of the of the menu is using the hamburger menu which listed down all the selection of option. It presents very well in terms of visibility for user that easier to see the functionalities of the application. But it must be tapping the button first only this menu can be show for user to use it for the functions.
Yeo Khang Hsien	The triple horizontal line menu or so-called hamburger menu icon is a good method to hide unnecessary features when the user does not intend to access it. However, the downside of this design is the small spacing between the icons is too near. This will result in high chances of wrongly pressed icons and some users might strain their eyes to search and press the correct icon.

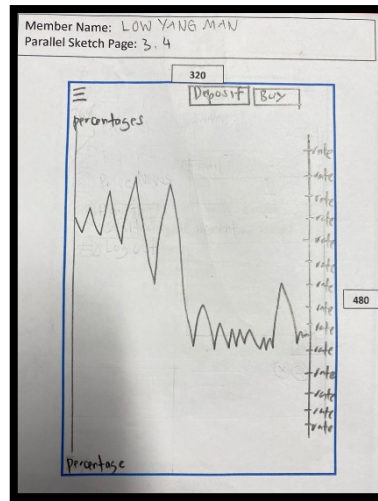


Figure 39 Parallel Sketch Page 3.4

Reviewer	Description
Andrew Chung Hui Yue	The graphs are able to show in full screen in every device due to the use of the hamburger menu which reduces the amount of space used. The user will have a bigger screen to show the graphs in which the user able to view the graphs more clearly. The button on top of the screen could easily be ignored by the users due to the location of the button placed in a location that is less discoverable by the users.
Loo Chee Hin	The design is chosen to present in graphical representation which using the graph for user to easy to predict the market stock in the future instead of present in numerical way. There has the axis that shows the percentage of raise or drop of the stock. The buttons might not put in order way which put on top of the page so some of the users might not able to see the buttons, it suggested to put on the bottom.
Yeo Khang Hsien	This design has the advantage of having a big space to display the graph. However, the disadvantage is the low visibility of the icons for the user to access.

3.1.4 Andrew Chung Hui Yue – Sketch 4

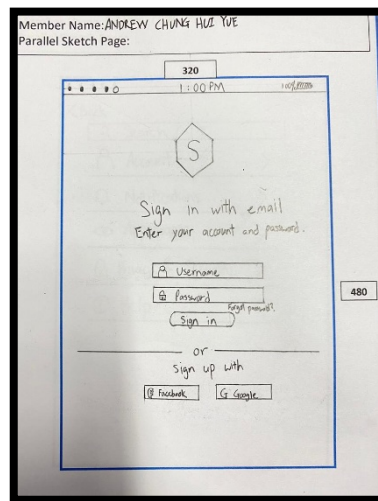


Figure 40 Parallel Sketch Page 4.1

Reviewer	Description
Low Yang Man	The concept of the design giving the good clear information to login and register. The icons can have easier review for the user to register and login.
Loo Chee Hin	The logo design is hexagon and it is very few designs that used for it. This design contained a bit more word for user to understand what is going on in the login page. The email and password fields have the placeholder to indicating the field of input. The separation of the fields for login and register is very well to let user understand which function for each user either access to application or create new account for new user.
Yeo Khang Hsien	The login page has a very clear concept, simple design and good positions of the icons to be access by the users. The line divides the upper part into login and the bottom part into register to be distinguished by the user easily.

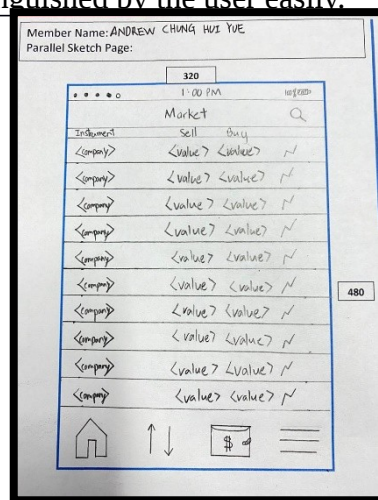


Figure 41 Parallel Sketch Page 4.2

Reviewer	Description
Low Yang Man	The company information giving the user have clear information

	the company, rate and value. This design giving the information for user to return back home page if the user selects the picture icon home page in the function page.
Loo Chee Hin	The concept of listing down the company with the details of the company name, the value of buy and see value. The design has the search icon for user to search the company and this is very efficient for user to search for a particular company and look for the details. The list is in rows and it is well arranged.
Yeo Khang Hsien	The design has the advantage of having a clear sight of columns for the user to view. An enhancement to this design will be a filter feature with the purpose of viewing specific information without going through all the information.

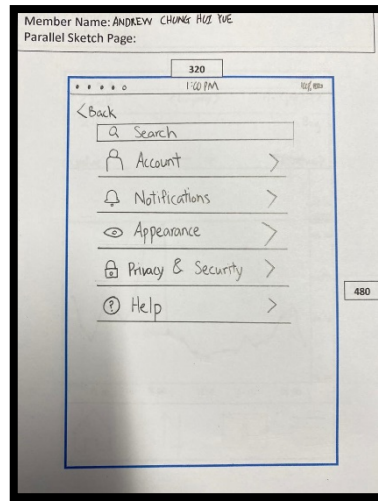


Figure 42 Parallel Sketch Page 4.3

Reviewer	Description
Low Yang Man	The design is easily to understand by the user to view and select the menu icon. Furthermore, the design of the line is neat and simple for the user to review.
Loo Chee Hin	The menu design is very simple and user friendly. It is very neat and arranged in vertical in rows. It has the search bar for user to search the function easily and with the icon and the label, this is very useful for novice user who are rely on the illustration.
Yeo Khang Hsien	The design is very user friendly and neat as the horizontal bar icon can hide and show the relevant information upon pressing. Additionally, the search function is an enhancement to search certain information, especially when the user is not sure which category the information falls.

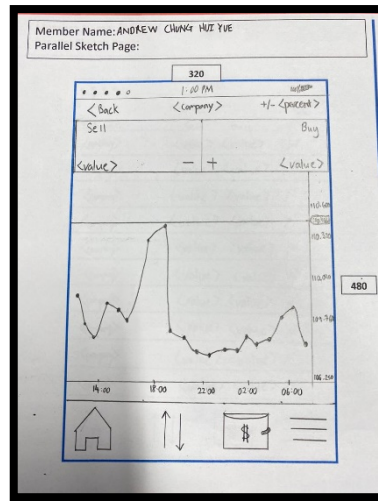


Figure 43 Parallel Sketch Page 4.4

Reviewer	Description
Low Yang Man	The design display of the graph has a good interface design which have the picture icons to give the user know what to do in the graph.
Loo Chee Hin	The details of the company are display and it is very informative for the company. The graph has a connecting point to show that the most crucial point of raise and drop of the market stock. The icon has displayed very big and it is easier for user to see and understand how to use for the buttons. The axis of graph for vertical axis is money and horizontal axis is time which shows that graph with the line to point that the current market value.
Yeo Khang Hsien	Although the design displays the graph, it is quite messy. The user will have to look for top and bottom to access certain functions. Moreover, the distance between the icons are too near which result in high chances of wrongly pressed icons.

3.2 Peer-to-Peer Evaluation

Based on all the sketches which done by each member in 4 and has to be evaluated for prototyping design, all member has to provide their own opinion and critical assessment to the sketches. From the evaluations that made by all member and the final decision is made to pick the sketch 1 as the best sketch and most suitable for the prototyping design. The reason of selecting sketch is because the usability is achieved which allow user to understand how to use in the application. In addition, it has followed the trend of simplicity which increase learnability so that the interface is memorable for user and use the application more efficiently. The functions are clearly stated and identified which allow novice user can understand the icon and label of its function with some metaphors for in case some of the user are rely on pictures. All functions can be manageable by the user and use them in short amount of time. Moreover, all process is done by straight forward and direct. By this way, the processing time will be shortened and ease user effort to use the functions in the application. Hence, the design has contributed to ensure the application sustainability and increase the productivity in application.

3.3 Participatory Design

3.3.1 Card Sorting Technique

Before doing the prototype, a UX tool has used to determine the menu and content in menu arrangement. This tool is running by OptimalWorkshop and the optimal sort is used to show the result after all participant has completed the card sorting.

3.3.2 Card



Figure 44 Card

There 30 cards are the content for the categories in developing the EzBet application. The cards are login, register, display current statistics, display current owned stocks, display company list, search company, buy/ sell, display transaction history, display notification, display news, display current balance, top up/ withdraw, about us, help, feedback, view profile, edit profile, change password, change profile picture, general settings, privacy settings, trading center option, transaction option, notification option, news option, wallet option, help & feedback option, logout, login link and register link.

3.3.3 Categories

Categories	
1. LOGIN	
2. REGISTER	
3. MENU	
4. PORTFOLIO	
5. TRADING CENTER	
6. TRANSACTION HISTORY	
7. NOTIFICATION	
8. NEWS	
9. WALLET	
10. HELP & FEEDBACK	
11. SETTINGS	
12. PROFILE	

Figure 45 Categories

These are 12 categories which is created for categorize the card as menu in the application. The categories are login, register, menu, portfolio, trading center, transaction history, notification, news, wallet, help & feedback, settings and profile.

3.3.4 Result Matrix

The results matrix

	LOGIN	REGISTER	MENU	PORTFOLIO	TRADING CENTER	TRANSACTION ...	NOTIFICATION	NEWS	WALLET	HELP & FEEDBA...	SETTINGS	PROFILE
LOGIN	3		1									
REGISTER		4										
DISPLAY CURRENT STATISTICS				2	1			1				
DISPLAY CURRENT OWNED STO...				3	1							
DISPLAY COMPANY LIST					3			1				
SEARCH COMPANY					4							
BUY / SELL					4							
DISPLAY TRANSACTION HISTORY						4						
DISPLAY NOTIFICATION							4					
DISPLAY NEWS								4				
DISPLAY CURRENT BALANCE									4			
TOP UP / WITHDRAW									4			
ABOUT US								1		2		1
HELP										3		1
FEEDBACK										3	1	
VIEW PROFILE			2									2
EDIT PROFILE			1	1								2
CHANGE PASSWORD		1										3
CHANGE PROFILE PICTURE	1										1	2
GENERAL SETTINGS											3	1
PRIVACY SETTINGS											3	1
TRADING CENTER OPTION			3	1								
TRANSACTION HISTORY OPTION			1			3						
NOTIFICATION OPTION			2				2					
NEWS OPTION			2					1			1	
WALLET OPTION			2						2			
HELP & FEEDBACK OPTION			2							2		
LOGOUT	1		2									1
LOGIN LINK	2	2										
REGISTER LINK	3	1										

Figure 46 Result Matrix


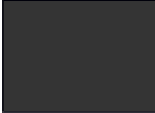
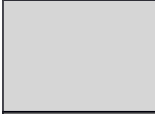



This is the results matrix which obtained from the card sorting technique. It is reviewed in matrix form. Based on the result, the highest score will be considered to put into the application with the card sorting technique. The following of arrangement of functions for the EzBet application but some minor changes will be discussed for not following the order.

The final discussion will for the arrangement as below:




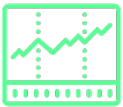








Menu	Content
Login	<ul style="list-style-type: none"> - Login - Register Link
Register	<ul style="list-style-type: none"> - Register - Login Link
Menu	<ul style="list-style-type: none"> - Trading Center Option - Transaction History Option - Notification Option - News Option - Wallet Option - Help & Feedback Option - Logout
Portfolio	<ul style="list-style-type: none"> - Display Current Statistics - Display Current Owned Stocks
Trading Center	<ul style="list-style-type: none"> - Display Company List - Search Company - Buy / Sell
Transaction History	<ul style="list-style-type: none"> - Display Transaction History
Notification	<ul style="list-style-type: none"> - Display Notification
News	<ul style="list-style-type: none"> - Display News
Wallet	<ul style="list-style-type: none"> - Display Current Balance - Top Up / Withdraw
Help & Feedback	<ul style="list-style-type: none"> - About Us - Help - Feedback
Settings	<ul style="list-style-type: none"> - View Profile - Edit Profile - Change Password - Change Profile Picture
Profile	<ul style="list-style-type: none"> - General Settings - Privacy Settings



3.4 Prototype Design Usage

3.4.1 Colour Theme Selection

Colour	Name	Purpose
	Sea Green RGB (85, 255, 147)	The Dark Grey Colour is selected to use for font and background title. This colour cop with Dark Grey Colour and it mostly used in icon colour.
	Dark Grey RGB (52, 52, 52)	The Dark Grey Colour is selected to use for background. This colour cop with Sea Green Colour and it used in some icon colour.
	Light Grey RGB (214, 214, 214)	The Light Grey Colour is selected to use for font.
	Grey RGB (112, 112, 112)	The Grey Colour is selected to use for font and the border of buttons.
	Green RGB (0, 255, 0)	The Green Colour is selected to use for raising properties such as balance and percentage. This colour also used for “on” something.
	Red RGB (255, 0, 0)	The Red Colour is selected to use for raising properties such as balance and percentage. This colour also used for “off” something.

3.4.2 Icon Selection

Icon	Name	Purpose
	Menu List	To show as a list of selection option in a tab-menu style.
	Balance	Looks like cash which is indicating on how much balance that owned by the user.
	Percentage	This is a percentage symbol which indicating the raise or drop for profit and lost in balance.
	Trading Center	A graph that has raise and drop line which is showing the raise of stocks and drop of stocks for the companies in market.
	Transaction History	A time is on the cash that is the meaning of the flow of cash through the time goes. Every transaction that has done in buying and selling that acts as the transaction history in the time goes on.
	Notification	A bell that rings for notifying people and this same goes as every important information has to be notify to user.
	News	A paper that a lot of words is meaning of the news that regarding to current incidence and the latest information that the user can be got to known in the first place.
	Wallet	Like a wallet and it contains money that refers the user how much balance owned by the user and the decision to add money or withdraw from the balance.
	Help & Feedback	Questioning symbol is the symbolize the questions that appear in the mind of user and it consist of answers for particular questions.
	Settings	Gears are used in machine and the settings on the mostly working with gears. This is referring the settings to users which will be modifying the profile details or application settings.
	Logout	An arrow is existing from the circle means that the user is logout from the application.
	Tick	A box that contains a tick is the meaning of ticked item.

	Raise	An arrow is pointing right upwards is looks like in graph is increasing linearly and this reflects to raise meaning.
	Drop	An arrow is pointing right downwards is looks like in graph is decreasing linearly and this reflects to drop meaning.

3.5 Justification of Prototype Design Purpose and Strategy

3.5.1 Login Page

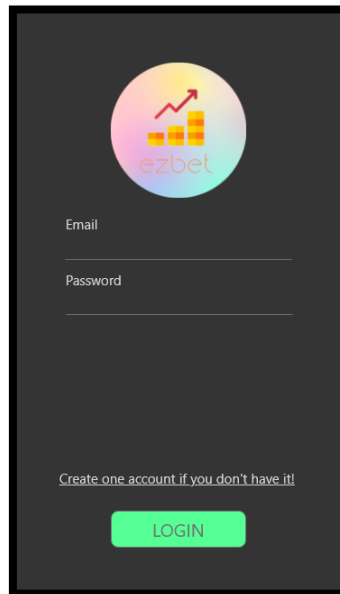


Figure 47 Login Page

The Login Page is for user to login into the application where the user is required to insert email and password in the email field and password field from registered account and allow to access and perform the functionalities that provided by the application by tapping “LOGIN” button. The “Create on account if you don’t have it” is a link that direct user to Register Page for new account creation.

Consistency

The layout of input field is aligned in center and the length of the input field is same with the spacing between input field is same. This is to achieve the target for user to easily adapt the application and familiarize the designed layout to ensure that the style of the application which is memorable by the user and the flow of operation will be smooth by using it.

Feedback

The “LOGIN” button has a change of colour, and it act as feedback behaviour. This is to tell the user is press the button and when the button is released from press, it will go back to default state.

3.5.2 Register Page

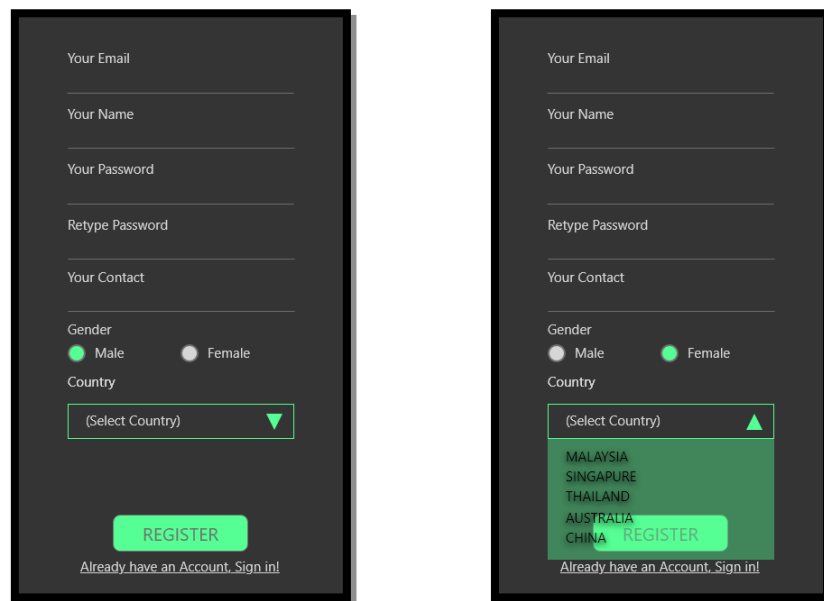


Figure 48 Register Page and After Dropdown

The Register Page is for user to register a new account for access to application purpose where the user is required to insert email, name, password, retype password, contact, select gender and pick country in the email field, name field, password field, retype password field, contact field, select option for gender and pick the country from a drop down list. After every fields and selection is done, tap “REGISTER” button for account creation and return to Login Page. If a user has an account, the user can tap “Already have an Account, Sign in!” for directing user to Login Page for new account creation.

Consistency

The layout of input field is aligned in center and the length of the input field is same with the spacing between input field is same. This is to achieve the target for user to easily adapt the application and familiarize the designed layout to ensure that the style of the application which is memorable by the user and the flow of operation will be smooth by using it.

Constraints

The gender selection is using a radio button which means only can be selected one for how many counts of option. This is the validation that allow user select a gender and restrict more than one gender selection.

Feedback

The “REGISTER” button has a change of colour, and it act as feedback behaviour. This is to tell the user is press the button and when the button is released from press, it will go back to default state.

3.5.3 Portfolio Page

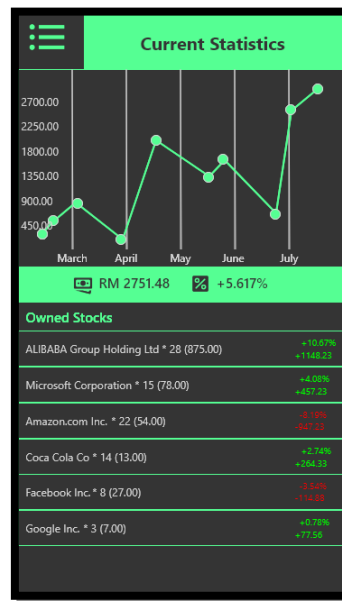


Figure 49 Portfolio Page

This is the master page of all the pages, and it serves as main page after the user has successfully logged in to the application then this page will be displayed before the rest of the functionalities can be use. In the Portfolio Page, it has the displayed the current statistics of the balance whether it is raising or dropping and it represented into graphical representation which has a line joining with the plotted axis (represented the changes on transaction) and have the value that represent the money value in vertical axis and the timeline in horizontal axis by month. The below is showing the current balance and the percentage of changes in transaction for either raise or drop. Below are the current owned stocks for the user and displayed the company name with the money value and percentage either raise or drop. The **Red Box** has shown a list icon for opening the list of selection menu purpose. The selection is to direct user to other pages that the user desire.

Visibility

The title of the page is very obvious for user to see the directed page. It has the big font is displayed for easier to see. The graphical representation is large enough for people to look the raise and drop of the chronological transaction. The balance and the percentage of current owning is aligned to center for people easily to notice and keep alert on it.

Mapping

The colour is utilized for representing the purpose of each colour selection. The most distinct difference is the colour Green and Red. The Green colour is selected to indicate that the money and percentage is raising. The Red colour is selected to indicate that the money and percentage is dropping. Both colours are map to the particular company and shows that the current market reflects to the company.

Affordances

A meaningful icon is selected as in the “list” button in **Red Box** with metaphor and it is easily for user get to know that it is a selection of option in the menu list.

3.5.4 Menu List

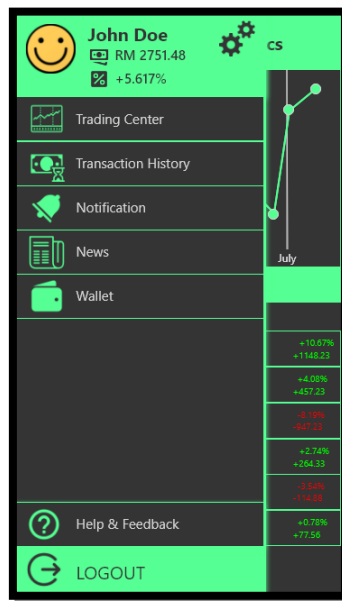


Figure 50 Menu List

The menu list is tapped out from the “list” button. The content consists of the option for settings, trading center, transaction history, notification, news, wallet, help & feedback and logout. The profile picture is in round shaped and beside the profile picture is the name of the user. The below of the user’s name is balance and percentage just same as the Portfolio Page which has the balance and percentage. The “Gears” icon is the settings button as shown in **Red Box**. The list of options is arranged in most priority to least priority. The “Trading Center” option is to direct the user to Trading Center Page, “Transaction History” option is to direct the user to Transaction History Page, “Notification” option is to direct the user to Notification Page, “News” option is to direct the user to News Page, “Wallet” option is to direct the user to Wallet Page, “Help & Feedback” option is to direct the user to Help & Feedback Page and lastly “LOGOUT” option is to exit the application then return to Login Page. This will be affected and only can be use after login but not present in Login Page and Register Page.

Visibility

The user's profile picture and name are present at the top left corner so when the user is tapped the "list" button, it will show it obviously and the balance and percentage which refer to the user will be displayed under the name. The selection of font size and colour is big enough for use easier to see the functionalities of the application.

Affordances

A meaningful icon is selected and most of the option are labelled with metaphor. All icon is selected which will make user easier to figure out the reason behind and use it with minimized doubts.

3.5.5 Trading Center Page

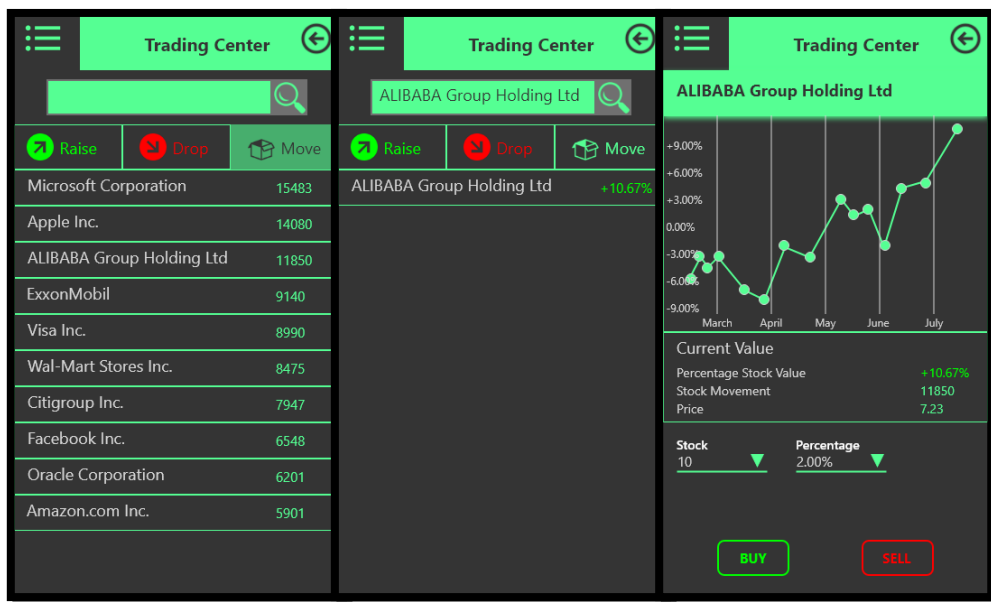


Figure 51 Trading Center with Search Result and Company Details

This is where the user selects the company and doing the transaction of stocks by buying or selling behaviour. When the page is initiated, it will show the top 10 list by categorized in Raise, Drop and Move sections. The companies that come with the raising percentage, dropping percentage and stock movement quantity on the right side. A search bar is for user to insert the company name and for the details. When the search is success and the result has found, it just shows only the particular company. The user is required to tap the company and show the details of the company. It is looks like Portfolio Page but the different is the vertical axis is showing the change in percentage. Below of the graph, the current value of the stock is displayed with the raise or drop percentage, the stock movement and the stock price. The user can adjust the stock quantity or stock percentage to buy or sell the stock by using “BUY” button and “SELL” button. In order to skip buying or selling, an icon “arrow left” is the back button where the function is return to previous page. This back button in [Blue Box](#) will be present in the page after the Portfolio Page where the page act as main page which required after pages are needed return to main.

Visibility

The title of the page is very obvious for user to see the directed page. It has the big font is displayed for easier to see. The graphical representation is large enough for people to look the raise and drop of the chronological changes in the stock of a company. The current value is aligned to center with the stock percentage, stock movement and stock price for people easily to notice.

Feedback

The “BUY” and “SELL” buttons have a change of colour and it act as feedback behaviour. This is to tell the user is press the button and when the button is released from press, it will go back to default state.

Affordances

A meaningful icon is selected and most of the option are labelled with metaphor. All icon is selected for easier understanding the categories when choosing the list of companies.

Mapping

The colour is utilized for representing the purpose of each colour selection. The most distinct difference is the colour Green and Red. The Green colour is selected to indicate the raising of stock percentage. The Red colour is selected to indicate that the dropping of stock percentage. Both colours are map to the particular company and shows that the current market reflects to the company. The usage of colours also indicating the buying stock in “BUY” button as Green colour and the selling stock in “SELL” button as Red colour.

3.5.6 Transaction History Page

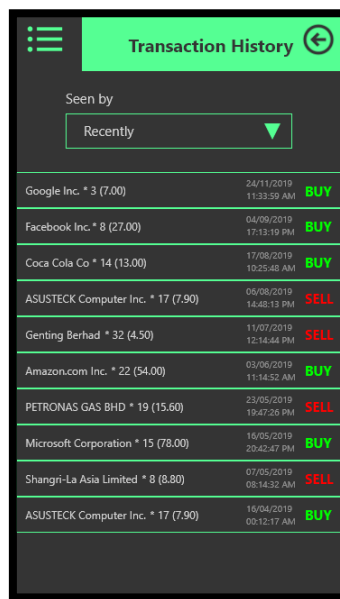


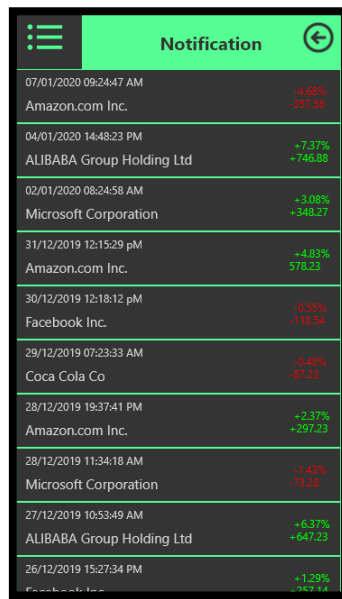
Figure 52 Transaction History Page

After buying or selling the stock, all the record will be stored in the transaction history list. In the list, it will show every transaction that done by the user. It can display the list which the selection of period in the dropdown option. The displayed record is showing the status of the owned stock whether buy or sell in display of “BUY” or “SELL” and the date and time for the respective company with the stock quantity and stock price. The back button is directing the user to Portfolio Page as mentioned in Trading Center Page.

Mapping

The colour is utilized for representing the purpose of each colour selection. The most distinct difference is the colour Green and Red. The Green colour is indicating the buying behaviour and The Red colour is indicating the selling behaviour for stock.

3.5.7 Notification Page



The screenshot shows a mobile application interface for a 'Notification' page. At the top, there is a green header bar with a hamburger menu icon on the left, the word 'Notification' in the center, and a back arrow icon on the right. Below the header, a list of notifications is displayed, each containing a date and time, a company name, and a stock price change. The notifications are separated by thin green horizontal lines. The background of the list items is a dark grey color.

Date and Time	Company	Change
07/01/2020 09:24:47 AM	Amazon.com Inc.	-1.68% -337.56
04/01/2020 14:48:23 PM	ALIBABA Group Holding Ltd	+7.37% +746.88
02/01/2020 08:24:58 AM	Microsoft Corporation	+3.08% +348.27
31/12/2019 12:15:29 pM	Amazon.com Inc.	+4.81% 578.23
30/12/2019 12:18:12 pM	Facebook Inc.	-0.55% 115.54
29/12/2019 07:23:33 AM	Coca Cola Co	-0.48% 87.33
28/12/2019 19:37:41 PM	Amazon.com Inc.	+2.37% +297.23
28/12/2019 11:34:18 AM	Microsoft Corporation	-1.52% -73.28
27/12/2019 10:53:49 AM	ALIBABA Group Holding Ltd	+6.37% +647.23
26/12/2019 15:27:34 PM	Facebook Inc.	+1.29% 169.64

Figure 53 Notification Page

Every important message will be notifying to user about the stock changes. It will show the stocks that has major changes in terms of raising or dropping the market value with stock percentage and stock price for respective company. For each change, it will show the date and time to allow user to get to know when the changes are happened. The back button is directing the user to Portfolio Page as mentioned in Trading Center Page.

Mapping

The colour is utilized for representing the purpose of each colour selection. The most distinct difference is the colour Green and Red. The Green colour is indicating the raising percentage of stock and stock price and The Red colour is indicating the dropping percentage of stock and stock price.

3.5.8 News Page

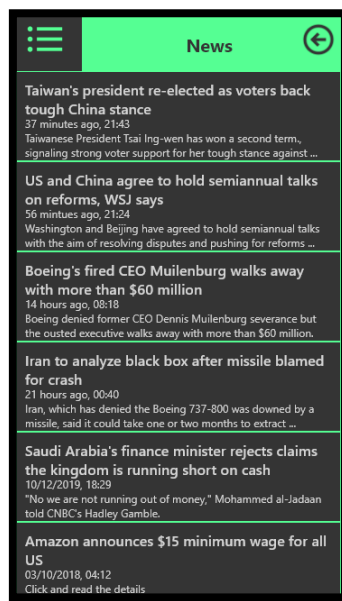


Figure 54 News Page

This page is just showing news in chronological way. The recent news will be on the top and the earlier news can be tap in to view the details. The recent news has displayed the title of the news and the short summary of what the news is needed to deliver the message to user in the publish time and the time that passed. The back button is directing the user to Portfolio Page as mentioned in Trading Center Page.

Visibility

The title and content are different by the font size and font weight. The title of the news is more attractive to user to read because the font is tended to bigger and the weight of font is heavier than the content.

3.5.9 Wallet Page

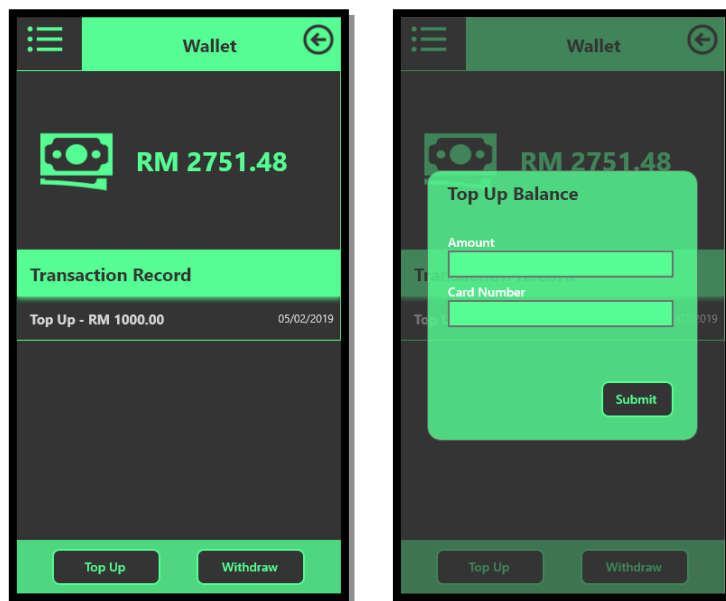


Figure 55 Wallet Page and Top Up Balance Form

User get the balance is by using this page of its functionalities. It displays the current balance and shows every transaction record for top up and withdraw of the balance. The record is displaying the amount for either top up or withdraw and with the date of transaction. By tapping the “Top Up” button, a form is displayed for user to insert the details. The field for insert the amount is required to be filled from user’s desire amount then card number is based on the credit or debit which owned by the user and it is required to be insert. After everything done, tap “Submit” button to submit the form and wait for the balance to update the value. This is exactly the same way when doing the balance withdraw function by tap “Withdraw” button. The back button is directing the user to Portfolio Page as mentioned in Trading Center Page.

Visibility

The balance is shown in very big font in the top center of the page. It is to show the balance of the user and this might make the user make decisions more precise and see the balance more clearly.

Consistency

The layout of input fields is aligned in center and the length of the input field is the same with the spacing between input fields is the same. The designed layout is to ensure that the style of the application which is memorable by the user and familiarize the application of flow of operation will be smooth by using it.

Feedback

The “Top Up” and “Withdraw” buttons have a change of colour and it acts as feedback behaviour. This is to tell the user if they press the button and when the button is released from press, it will go back to default state. The same goes to “Submit” button when the user is tapping the submit button.

3.5.10 Help & Feedback Page

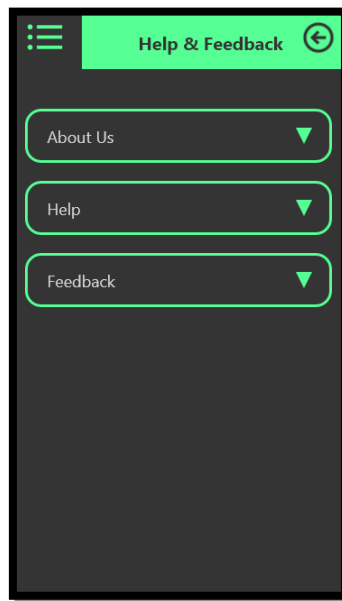


Figure 56 Help & Feedback Page

The user is decided to search for help, this page has the option for user to look for the application purpose in “About Us”, the Frequently Asked Question (FAQ) in “Help” and for user to feedback the application in “Feedback”.

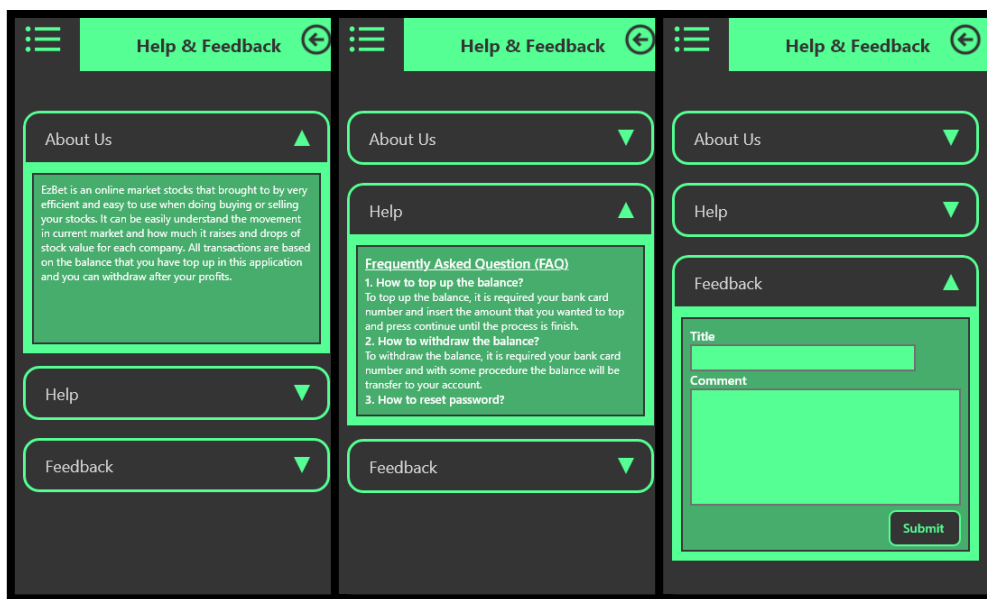


Figure 57 After Opening About Us, Help and Feedback

All concept of selecting the option is like dropdown the item then to display the content. Only the “Feedback” can allow user to feedback the application by insert some of the details. The back button is directing the user to Portfolio Page as mentioned in Trading Center Page.

Consistency

The layout of input field is aligned in center and the length of the input field is same with the spacing between input field is same. The designed layout is to ensure that the style of the application which is easy to adapt the function in the application.

Feedback

The “Submit” button have a change of colour and it act as feedback behaviour. This is to tell the user is press the button and when the button is released from press, it will go back to default state.

3.5.11 Settings Page

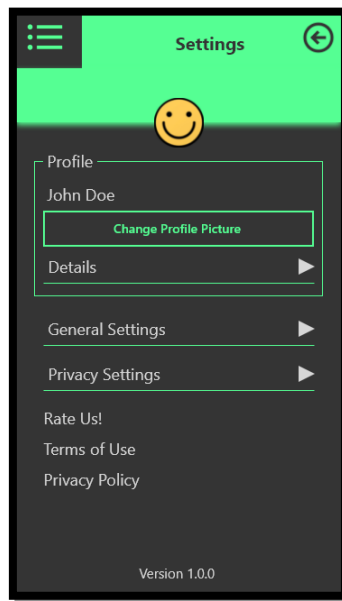


Figure 58 Settings Page

In the Settings Page, it has showed the profile picture of the user with some of the details and setting that can able to set and change the information. In the profile group, it consists of user's name, "Change Profile Picture" button and a Profile Details link. The only editable links are by tapping "Change Profile Picture" and Details. The General Settings and Privacy Settings is directed to set some of the feature about the application. After those editable option, "Rate Us!", "Terms of Use" and "Privacy Policy" are the link that direct to the browser. At the bottom of the page, it has shown the version of the application.

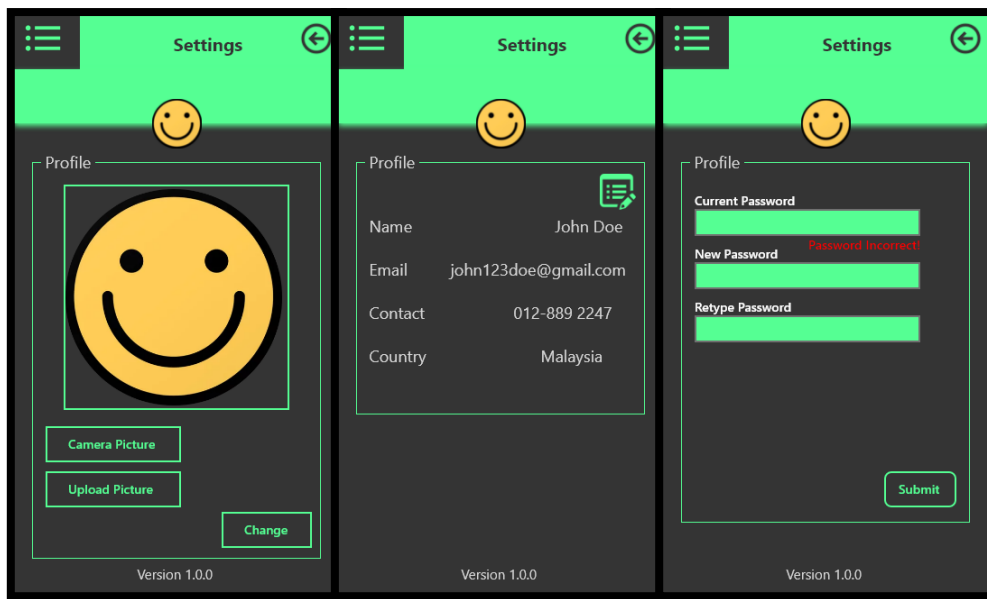


Figure 59 Profile Details Changing Option

From the “Change Profile Picture” button, the user can select the picture by capture the image in “Camera Picture” button or upload file picture in “Upload Picture” button. Once the picture is selected, tap “Change” button to change the profile picture. When the user wants to change the details, the user must tap Details and then the user details is displayed. An icon is “Paper with Pen” button is to direct user for edit user. When the user is in the change details page, it must fill all the details to change the profile. An example of in changing new password to user. For both change details and change password has a “Submit” button to submit the changes.

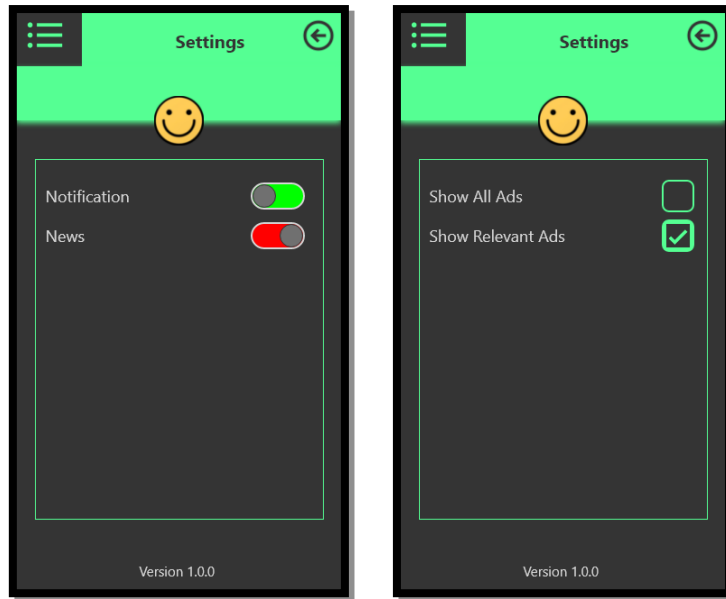


Figure 60 General Settings and Privacy Settings

By selecting the General Settings or Privacy Settings, this allow user to turn on and off for Notification, News, Show All Ads and Show Relevant Ads. Once everything has done, the back button is directing the user to previous page until it reaches to Portfolio Page as mentioned in Trading Center Page.

Consistency

The layout of input field is aligned in center and the length of the input field is same with the spacing between input field is same. The designed layout is to ensure that the style of the application which is memorable for user and make it more adaptive to ensure that the style is easier use for user.

Constraints

The on and off selection for General Settings is a sliding style. For sliding to left is an off flag otherwise it is an on flag. The Privacy Settings is a checkbox style. For allow to do the function, the user have to decide on whether check or not check.

Feedback

The “Submit” button have a change of colour and it act as feedback behaviour. This is to tell the user is press the button and when the button is released from press, it will go back to default state. When the user submits a mismatch password, an error message is displayed in red in the **Red Box** and it is in red font colour.

Affordances

A meaningful icon is selected and most of the option are labelled with metaphor. The edit of details is easier to understand where to edit the profile.

4.0 Evaluation and Testing

4.1 Evaluation

Usability evaluation is the use the product to achieve their goals to focus on how the users can learn. The users can gather the information in an existing site and plans related to new site to use variety of methods that gather feedback to develop a new system (Usability.gov, 2020). The stages of the DECIDE framework assign the basics for the design of this toolkit, which currently supports two evaluation methods are heuristics evaluation for application and standard survey and questionnaires.

4.2 Decide Framework

The stages of DECIDE framework are as follows:

- Determine the goals the evaluation addresses
- Explore the specific questions to be answered
- Choose the evaluation paradigm and techniques to answer the questions
- Identify the practical issues
- Decide how to deal with ethical issues
- Evaluate, interpret, and present the data

4.2.1 Determine the goals the evaluation addresses

The main purpose of developing this app are Home, Feedback, Informative, Stock Buying Transaction, Trading Center and every goal we have used metaphors. Example: In the login menu we have posted a button which tells the user that this is the way to go to login after the registration. In trading center and all the menu, it is easily recognized that what the menu needs to do. All the design interface of application having same background color and the buttons are on the same place. Each goal is related on each master page of the interfaces.

Explore the specific questions to be answered

The questions, operational must be answered to satisfy the user to be notify the goals are needed point out that:

1. Is the response time too slow?
2. Is the user interface to the application have a poor that it is hard to use?
3. Is the system difficult to buy the stock share?
4. Is the step of stock share terminology confusing the user because it is inconsistent?
5. Is the feedback confusing or maybe insufficient?
6. Does the system have bug?
7. Does the feedback give the proper answer for user?
8. Is the FAQ question help the user understands better if they using the system?
9. Does the system have difficulty for the user to use?
10. Does the user facing with incompatible device while using the system?

4.2.2 Choose the evaluation paradigm and techniques to answer the questions

The goals and main survey and questionnaires have identified, the evaluation paradigm and techniques are the next step. There are kinds of techniques can be used for the evaluation paradigm to determine the goals. The system must be considered the practical and ethical issues. Furthermore, the trade-off made must be considered as well. In this situation, we must select the usability testing paradigms for evaluation to perform a task for some user to test the system. The button of login must be able clicked and the other expressions able to work as well. The Ezbet App has performance stock rate list of company that have shown which is perfect for every user to use it for testing. The performance stock rate is to help the identify the company are used to check stock share data in Ezbet App. The work of app can be useful for user who want to buy the stock online. Ezbet App is to help the user to have easiest testing to recover and make the app perfect for all user to use it.

4.2.3 Identify the practical issues

The evaluation is very important to state out the various of practical issues that need to be considered before starting to test the system. The issues should be considered include the users, facilities, equipment, schedules, budgets, and expertise evaluators. The compromises need to be involved to adapting or substituting techniques depends on the availability of complete resources. The main are:

1. The users need to be available
2. The stock transaction needs to be done on time
3. The stock transaction budget needs to be considered
4. The user must have preparation of the cost on the stock transaction need to be under budget
5. The equipment needs to fulfill the stock share requirements must be available on time
6. The availability of expert person needs to be considered

4.2.4 Decide how to deal with ethical issues

- The user information of the system must be confidential. The payment offered should be stated clearly.
- The users need to treat the system politely
- The expectations should be acknowledging the user participants with good guidelines.
- The users need to ask permission in advance how to buy stock online with showing a good guideline copy of the report before the system is distributed.
- The documentation should not quote without the agreement
- The participants need to know what happening in the findings

4.2.5 Evaluate, interpret, and present the data

The important step of the evaluation is to choose the good paradigm and techniques to answer the questionnaire that need to be satisfy a good system design interface. The practical issues and ethical issues need to be resolved and identified clearly because it is for the user the interpret and present the data effectively. Furthermore, we need to decide what are needed on how data need to be collected, how to analyze it and how to present the findings to the development team. If there are still have choices, the techniques used to determine the type that need to be collected. For example: The data should be treated statistically. The analyzed and represented data need to base on the qualitative data has been collected. The general question needs to be considered for the user to evaluate, interpret and present the data:

- Reliability: Is the system that we proposed reliable for everyone to use it?
- Validity: Is the measurement fulfill that we expect to propose this system?
- Bias: Is the process bias result without errors?
- Scope: Is the system can be generalized? Example: What is the purpose of the system?
- Ecological Validity: Is the evaluation of the system affect your influencing findings?

4.3 Usability Testing

Based on this study, we are interested in gaining a better understanding of the problem people have when using the newly designed stock share online Ezbet mobile application. Asia Pacific University is an interactive mobile application created to offer informative, and customer supports for the general public to use for buying and selling stock share online mobile application. The following pages have tasks for every team member to complete that will help us achieve that better understandings about the mobile application that we had implement for new beginners. In order to help the team members to complete the tasks, it is important for us to know what is going inside our mind. Furthermore, as the team members needed to complete the tasks, we would like to give the explanation what we looking for, what we are thinking about, what are confusing to us and what we need to have the exact understandings of the mobile application that we have implement.

4.3.1 Task 1- Logging into Ezbet App

- a) Find where to register an account
- b) Create the new account OR register using the email
- c) Find where to login with new account
- d) Assume that user forgot password. Our task has function recovered it
- e) Login to your account OR login using email

4.3.2 Task 2- Explore the Ezbet Mobile Application

- a) Spend one minute exploring the home menu
- b) Now, spend another time three minute exploring the system anything you want

4.3.3 Task 3- Navigate the Ezbet Mobile Application

- a) Navigate to the stock transaction page and return to home page
- b) Navigate to the transaction history and return to home page
- c) Navigate to the trading center and return to home page
- d) Navigate to the buying and selling stock status and return to home page

- e) Navigate the profile page and return to home page
- f) Navigate the news and notification and return to home page
- g) Navigate the trading center and return to home page
- h) Navigate the wallet balance and return to home page

4.4 Usability Testing Report

Ezbet Stock Share Mobile Application

Low Yang Man

25 December 2019

4.4.1 Introduction

The Ezbet Stock Share is the mobile application designed to be used by the general public and the administrators. The purpose of the mobile application in the perspective of the general public is to be an information gateway with added ability to do stock transaction and give a beginner guide from the administrator in order to help the user to know how user the mobile application. Furthermore, the propose of mobile application in the perspective of the administrator is to manage administrator's personal trading center, manage all assignment assigned interface in the stage 3 and user inquiries and handle the user requirements.

The test was conducted by the both the primary user groups, new beginner and administrator to evaluate the usability for all the functionalities in the mobile application design. The researcher conducted the testing using a mobile laptop that equipped with Adobe XD to run the prototype design of the mobile application. The prototype design was used during the entire session to capture each's user requirement to be evaluated later. The testing prototype design each user's stock transaction rating for each user buy or sell, questions, feedback, and company stock share listing.

4.4.2 Executive Summary

The researcher has conducted the evaluation testing on the prototype design which we have create a prototype design of stock share mobile application which is Ezbet in Asia Pacific University on the 13th and 14th in the month of the December of the year 2019. The purpose of the test is to evaluate the usability of the mobile application to ensure the interface design, information flow, information architecture is as extraordinary as possible.

The first day will be conducted by the five general public volunteers from Asia Pacific University volunteers in using the application whereas, the second day will be conducted by five administrators at Asia Pacific University. Each session conducted for each participant of the general public is of an estimate of 30 minutes. Each of participation before the evaluation test is given a consent from to be filled up and give a clear information about the design need to be improve.

4.5 Heuristic Evaluation



ASIA PACIFIC UNIVERSITY

Client: Asia Pacific University Student

Discipline: Usability

Project: Evaluated the Ezbet Stock Share Mobile Application to

find usability issues in the design

4.5.1 Introduction

A heuristic evaluation for the Ezbet Stock Share Mobile Application was conducted on October 19th, 2019. This report presents the findings and recommendations arising from the evaluation conducted.

The mobile application is primarily for by five target audience which is the general public and the administrator. The five-target audience have their own their own functionalities and screen pages. The general public can

- a. Register, login or recover a password for an account
- b. Able to navigate from page to page through the navigation bar or by searching
- c. View their home page
- d. Perform stock transaction of share which include payment or submit a stock transaction form
- e. Explore transaction history
- f. View FAQ or submit a new question
- g. Conductive a news with an administrator

On the other hand, the administrators are to able

- a. Register, login or recover a password for an account
- b. Able to navigate from page to page through navigate bar or by searching
- c. View their home page
- d. Able to view and delete, favorite or send mail stock share transaction to recipient or a group of recipients at once.
- e. View their respective workstations which include assignments and inquiries to be evaluated
- f. View and reply to questions or approve customer stock transaction form.

Each reviewer spent an approximate 2 hours in using mobile application and evaluated it.

Reviewer 1: Phang Chee Seng**Issue: Visibility of System (4 Issues)**

Severity	Location	Issues	Recommendation
H	GP-Stock Transaction	The advance selections are hidden within the stock transaction icon	Modify the existing icon to more stock transaction icon for better transparency
L	GP- Payment	There is no present title that indicates the content of the page for payment during ticket stock transaction process	Add a title that goes along the lines of "Payment" at the main menu page.
L	A-Mail	There is no present title that indicates the content of the mail page	Add the title that goes along the lines of "check mail" at the main menu of the page
L	A-Support Team	No status indicator if a user need support guidelines of stock share online	Display a support chat group to show the user is online but display a notification indicator if there are unseen messages

Issues: User Control and Freedom (2 Issues)

Severity	Location	Issues	Recommendation
M	GP-Stock Transaction	Unable to cancel stock share transaction mid process but must forcefully go back	Provide button to cancel order at the top right of each relevant page
M	GP-Login	Unable to have login connect to google if user forgot password	Provide a google icon that link to the google mail at login page screen

Reviewer 2: Chong Kah Poh**Issues: Consistency and standards (3 Issues)**

Severity	Location	Issues	Recommendations
M	GP-Trading Center	The advance of buy and sell need to give user to know to confirm with submit if the user buys and sell the stock transaction	Provide a submit button after the buy and sell if the user wants to buy the share.
M	GP- Transaction History	The advance of buy and sell need to give user to know to confirm with briefing history	Provide another button for transaction history if the user has selected the buy and sell with detail history with date and time.
M	GP-Shortcut	The advance of shortcut of buy with alphabet give user have easily to manage	Provide a shortcut icon for user to buy stock transaction share

Issues: Error Prevention (2 Issues)

Severity	Location	Issues	Recommendations
M	GP-Trading Center	The advance of rules of format of search of company	Provide a correct spelling to validate the correct company for user to search
H	A-Login	The advance of rules of format of user password	Provide a password strength notification to give the user suggestions

Researcher 3: Choo Jun Meng**Issues: Recognition and Recall (4 issues)**

Severity	Location	Issues	Recommendations
M	A-Trading Center	The advance of suggest the option of search to let the user remember what they look for	Give the suggestions of company which located in the trading center if the user search the company
M	GP-Wallet	The advance of suggest the option of wallet guidelines	Give the suggestions of wallet guidelines to let the user know how to add wallet
L	GP- Notification	The advance of suggest the options of notification	Give the user guidelines on simple notification on how to close the notifications
L	GP-Help and Feedback	The advance of suggest the option of help how the application work	Provide a help guideline on how to use the application in help main page

Issues: Flexibility and effectively of use (1 Issues)

Severity	Location	Issues	Recommendations
L	A-Login	The login should be notifying user and admin user flexibility	The admin should advance settings button for flexibility use

Researcher 4: Teh Wei Han**Issues: Help to recognize diagnose and recover from errors**

Severity	Location	Issues	Recommendations
H	A-Login	The advance check on the login can be recover through email	Provide the notify words to recover user password if the user forgets the password thought email
H	GP-Trading Center	Need to avoid the message for user to misunderstandings	The admin needs to give clear information for user to use it without giving user wrong instructions.
H	GP-Wallet	The advance of minimum amount for user to add money to the wallet	The admin need give the recognize the user the minimum with clear guidelines in wallet page
L	GP-Register	The advance of repeated email if user insert same email	Provide email notification if the user uses the same email address with telling the user to use different mail

Issues: Help and documentation (1 Issues)

Severity	Location	Issues	Recommendations
H	GP-Main Page	The advance to increase the user guidelines on how to use the application	Provide the full documentation on how use the application for new beginner

Researcher 5: Wong Yi Hao

Issues: Help and Documentations (1 Issues)

Severity	Location	Issues	Recommendations
H	GP-Main Page	The advance to increase the user guidelines on how to use the application	Provide the full documentation on how use the application for new beginner

Issues: User control and freedom

Severity	Location	Issues	Recommendation
M	GP-Stock Transaction	Unable to cancel stock share transaction mid process but must forcefully go back	Provide button to cancel order at the top right of each relevant page
M	GP-Login	Unable to have login connect to google if user forgot password	Provide a google icon that link to the google mail at login page screen

4.5 Impact of the evaluation of the project

The system must be evaluating clearly so it can allow the user to better understanding and effective. So, the system able to compete to the market. The main impacts of the results are:

- The interface of the system must be easily understood and consistent. So, the user like to use our system.
- The interface of all the button and tools must have a proper feedback. So, the user knows what how to handle the system properly.
- The visibility must be easily to handle and have the perfect tools to support the system.
- Ensure that the system is error free before implement the system to the public.
- The perfect metaphors make the system more memorable and easily to use.

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6.0 Appendix

6.1 Proposal



Human Computer Interaction (Proposal)

Module	:	CT026-3-2 Human Computer Interaction
Intakes	:	UC2F1905IS-UC2F1905IT(BIS)
Date Assigned	:	Week 01 - 30th September 2019
Date Due	:	Week 14 - 24th January 2020
Lecturer	:	MRS AIDA ZAMNAH BINTI ZAINAL ABIDIN
Title	:	EzBet Online Betting Mobile Application
Group Member	:	Yeo Khang Hsien TP051413
		Low Yang Man TP054001
		Andrew Chung Hui Yue TP046091
		Loo Chee Hin TP046360

Introduction

EzBet is the Stock Trading platform that designed for touch screen mobile devices such as smart phones and tablet computers. The EzBet are the platform changing what mobile can do which can the people with smartphones. This EzBet are free and anyone can use it. The EzBet have millions of applications available that can help you managing your life one or the other way and it is available low cost in market at that reason's android is very popular and reliable. The EzBet always pushing what is possible because it can open to everyone, developers, designers and device makers which can be define the more people can experiment, imagine and create things the world has never seen through the mobile application. The user and organization can use the android mobile apps have the comfortability to use the android mobile apps because it has protected with security. The google play protect scan all your apps, the software get regular security updates and platform is always improving the android mobile apps security and new updates. This technology can useful to everyone. Everyone has their own way of using their devices. That's why we build accessible features and products that work for the various ways people want to experience the world. Screen readers, sound mufflers, even AR walking guides. Because when it comes to technology, there's no one-size-fits all.

Objective

EzBet is a mobile application that allow the users to trade a wide range of financial assets including stocks, forex pairs, binary option, cryptocurrencies and Exchange-traded fund (ETF). The objective of EzBet is to enable investors and traders to place trades and monitor accounts through financial intermediaries. On top of that, the design of the EzBet will be simple and organised as the target users might be beginners or experts so it must be user-friendly. In addition to that, the concept of EzBet is designed to increase the mobility of the users by using the smartphones instead of heavy laptops which this allow the user to monitor their financial assets and obtain the latest news at any time. Furthermore, EzBet should contain different features such as fundamental research tools and charts that can reduce the time taken for the user to achieve what they want. The fundamental research tools allow the traders to quickly look up information of a company including financial metrics, news and historical earnings information. This tool can bring convenience for the users rather than searching the internet to obtain the information. The charts are the most important tool for the users to make technical analysis which the charts include Line chart, Bar chart, Candlesticks chart and so on.

Problem Statement

There are a lot of applications that is hard to use for doing betting activities. Many of the user, for example, novice or as known as beginner users who they are not really comprehend the concept or the flow of the betting system. This will be increasing the risk of making decision when deciding to buy the stocks or even sell the stocks. Also, it might reduce the customer's satisfaction on the betting system which will lead to higher possibility of getting loads of complains from users. Some of the betting systems are using the old school style. This is meaning that the system only just has buying or selling the stocks which will need a high level of knowledge to allow the user, as known expert user to use the betting system. Furthermore, the lack of features in the system might make the system less efficient in terms of performance. The old school style betting system does not have the analysis solution or future prediction for the user. This is not user-friendly for the beginner or novice user. The notifications sometimes not so clear or even do not have this feature to notify the user about the new stuff. The users are hard got to know the information or do not know where to see for the information. Sometimes the information is not chronological style. This will make the user missed out many information, may be something important will be missed as well. The colour theme for the application was not consistent. Some pages on the applications are not using the right theme of the colour. In addition, the brightness of the colour and the contrast of the colour are hard to see the font. The colour on the application sometimes bright and dull. This will cause the eye fatigue when using the application. The using of the font sometimes confusing the user. The size of the font is not using appropriately for each page. For example, the title of the page for some are unclear, hard to find and misleading to the user. Some important directory or link also hard to see. The confusion of the system will cause struggles to the user. More than that, most of the applications are heavily use of fonts instead of graphical representation. This is making the application less interactive and less attractive to the user. The users might uninstall the application if the application is not attractive to the user. Heavily using the fonts to make an application will cause eye fatigue as well because human like to see graphics instead of words. In short, the features implementation are very less in some application, and the colour theme, font design and representation of the system are not unclear and hard to comprehend towards the system, the user friendliness have to be concerned in future development.

Proposed Solution

Solutions were introduced to solve the problem currently surfaced. The concept for solving the usage problem in which a novice user is not familiar with the system is providing user guidelines to enhance the knowledge of the user to the system, usually can be found in “Help” feature. However, the user might still have the problem upon decision making on buying and selling stocks even with the user guide. In this case, the system will implement an artificial intelligent algorithm to predict the outcome of the stocks. The algorithm will collect and analyse the past information of the stocks, then keep updating the information to modify the prediction in order to reduce the deviation of the prediction from the real outcome. Hence, the algorithm will maximise the possibility of profit gain and reduce the profit loss in terms of probability, thus reducing the risk of decision making by the user by providing predictions based on data pattern. In other words, the system does not require a user with high level of knowledge to perform its function. Additionally, the system will notify the user about the latest information in details to keep the user update. By applying user design principles, the system will have a consistent page design which has the same colour theme. In this case, blue light is the major cause of eye strains to the user. Hence, blue light content can be reduced by choosing low blue light content colours combination between text colour and background colour. The combination can be any of red, orange, or yellow colour text with a black colour background, or a black colour text with yellow or brown colour background. Additionally, the font size of text can be adjusted by the user to reduce eye fatigue. The solutions will result in high visibility to the user as the page will deliver its information and functions to the user clearly and precisely without rises some issues such as small font size and unclear tittle which often misleads the user. Moreover, the system will implement more graphical design than fonts which applies the design principles of affordances and mapping to attract the user with the advantage of drawing familiarity from the user cognition by implementing reasonable and related icons. In short, the key of human computer interaction is user friendly functions.

Workload Matrix

Stage	Yeo Khang Hsien TP051413	Low Yang Man TP054001	Andrew Chung Hui Yue TP046091	Loo Chee Hin TP046360
1 - User, Tasks & Environment	70%	20%	5%	5%
2 - Usability goals, guidelines and Competitive Analysis	5%	5%	70%	20%
3 - Design & Prototype	10%	10%	10%	70%
4 - Formative Evaluation	5%	70%	20%	5%

Gantt Chart

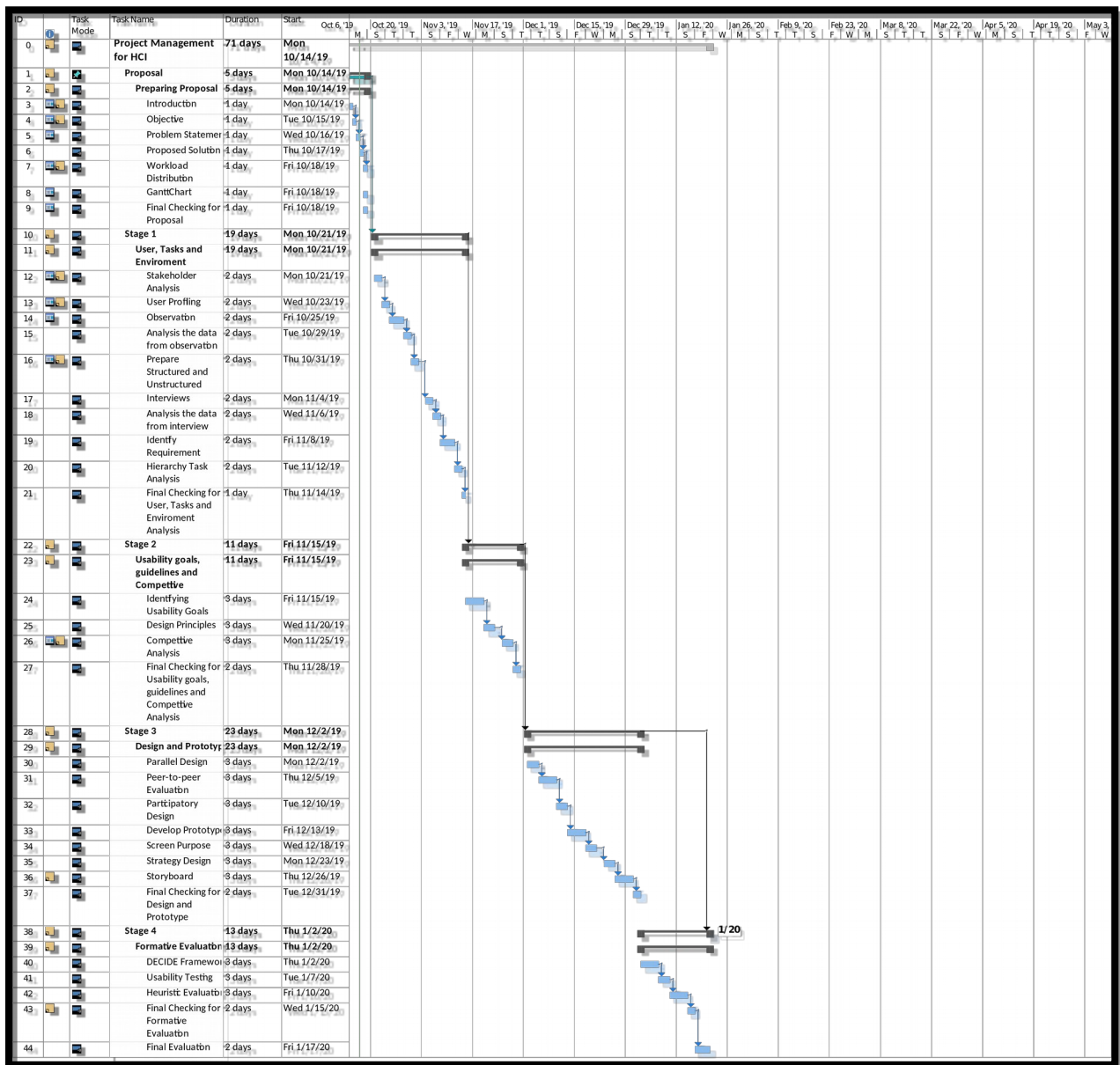


Figure 61: Gantt Chart

6.2 Workload Matrix

Name	Task	Signature
Yeo Khang Hsien (TP051413)	Stage 1: User, Tasks & Environment Analysis	
Andrew Chung Hui Yue (TP046091)	Stage 2: Usability goals, guidelines and Competitive Analysis	
Loo Chee Hin	Stage 3: Design & Prototype	
Low Yang Man (TP054001)	Stage 4: Formative Evaluation	

6.3 Minutes of Meeting

6.3.1 Meeting 1

Minutes of Meeting

UC2F1905IS/BIS	CT026-3-2-HCI	Human Computer Interaction
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Date : 4 November 2019

Time : 8:30a.m. – 10:30a.m.

Venue : B-08-09

ATTENDANCE

Present: Andrew Chung Hui Yue, Loo Chee Hin, Low Yang Man, Yeo Khang Hsien

Absent : -

No	Description	Action
1.0	Address by Chairperson The Chairman extended a warm welcome to team members	Chairperson
2.0	Confirmation of Previous Meeting Minutes	
3.0	Main Items for Discussion 2.1 Planning 2.1.1 Assigning each member to different stages of assignment parts. 2.2 Proposal 2.2.1 Introduction will be done by Andrew Chung Hui Yue. 2.2.2 Problem Statement will be done by Yeo Khang Hsien. 2.2.3 Proposed Solution will be done by Loo Chee Hin. 2.2.4 Gantt Chart will be done by Low Yang Man. 2.2.5 Submit proposal report	
3.0	The Meeting ended at about 10:30a.m. Date of next meeting is 11 November 2019 (Monday).	

Minutes prepared by:

CC:

(Yeo Khang Hsien)

Secretary

4 November 2019

(Loo Chee Hin)

Leader

6.3.2 Meeting 2

Minutes of Meeting

UC2F1905IS/BIS	CT026-3-2-HCI	Human Computer Interaction
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Date : 11 November 2019

Time : 8:30a.m. - 10:30a.m.

Venue : B-08-09

ATTENDANCE

Present: Andrew Chung Hui Yue, Loo Chee Hin, Low Yang Man, Yeo Khang Hsien

Absent : -

No	Description	Action
1.0	Address by Chairperson The Chairman extended a warm welcome to team members	Chairperson
2.0	Confirmation of Previous Meeting Minutes	
3.0	Main Items for Discussion 2.1 Proposal Accepted by the Lecturer 2.2 Stage 1. 2.2.1 Yeo Khang Hsien is in charge of stage 1. Each group member contributes in searching for the source of information in the data gathering section for 'studying information'. Analysis of list of requirements and Task analysis will be done according to the survey feedback. 2.3 Stage 2. 2.3.1 Andrew Chung Hui Yue is in charge of stage 2. The task will be carried out with each group member assisting Andrew Chung Hui Yue to identify the user requirements in the user guideline in accordance to the six design principles.	
3.0	The Meeting ended at about 10:30a.m. Date of next meeting is 23 November 2019 (Monday).	

Minutes prepared by:

CC:

(Yeo Khang Hsien)

Secretary

11 November 2019

(Loo Chee Hin)

Leader

6.3.3 Meeting 3

Minutes of Meeting

UC2F1905IS/BIS	CT026-3-2-HCI	Human Computer Interaction
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Date : 23 November 2019

Time : 8:30 a.m. - 10:30 a.m.

Venue : B-08-09

ATTENDANCE

Present: Andrew Chung Hui Yue, Loo Chee Hin, Low Yang Man, Yeo Khang Hsien

Absent : -

Absent with reason: -

No	Description	Action
1.0	Address by Chairperson The Chairman extended a warm welcome to all members	Chairperson
2.0	Confirmation of Previous Meeting Minutes	
3.0	Main Items for Discussion 2.1 Stage 1 and stage 2 is clearly identified and confirmed. 2.2 Loo Chee Hin is in charge of stage 3. 2.2.1 All group members will contribute and assist in parallel design, then perform peer-to-peer evaluation on each design. 2.3 Loo Chee Hin will conduct participatory design once the peer-to-peer evaluation has been verified.	
4.0	The Meeting ended at about 10:30p.m. Date of next meeting is 12 January 2020 (Monday).	

Minutes prepared by:

CC:

(Yeo Khang Hsien)

Secretary

23 November 2019

(Loo Chin Hin)

Leader

6.3.4 Meeting 4

Minutes of Meeting

UC2F1905IS	CT026-3-2-HCI	Human Computer Interaction
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Date : 13 January 2020

Time : 8:30 a.m. - 10:30 a.m.

Venue : B-08-09

ATTENDANCE

Present: Andrew Chung Hui Yue, Loo Chee Hin, Low Yang Man, Yeo Khang Hsien

Absent : -

Absent with reason: -

No	Description	Action
1.0	Address by Chairperson The Chairman extended a warm welcome to all members	Chairperson
2.0	Confirmation of Previous Meeting Minutes	
3.0	Main Items for Discussion 2.1 Low Yang Man is in charge of stage 4. 2.1.1 Evaluation will be done in accordance to the previous stages. 2.2 Documentation will be done by all group members together to be compiled and verified before submission.	
4.0	The Meeting ended at about 10:30 a.m. There are no more upcoming meetings.	

Minutes prepared by:

CC:

(Yeo Khang Hsien)

Secretary

13 January 2020

(Loo Chin Hin)

Leader