

UNIVERSITI TEKNOLOGI MARA

**ENTRE-HUB
A C2C BUSINESS PLATFORM
FOR UITM JASIN COMMUNITY**

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SUPERVISOR'S APPROVAL

ENTRE-HUB C2C E-COMMERCE SYSTEM FOR UiTM

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This report was prepared under the supervision of project supervisor, Miss Fadzlin Binti Ahmadon. It was submitted to Faculty of Computer and Mathematical Sciences and was accepted in partial fulfilment of the requirements for the degree of Bachelor of Computer Science (Hons) Netcentric.

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30 JULY 2015

DECLARATION

I certify that this report and the project to which it refers is the product of my own work and that any idea or quotation from the work of other people, published or otherwise are fully acknowledged in accordance with the standard referring practices of the discipline.

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30 JULY 2015

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“IN THE NAME OF ALLAH S.W.T, THE MOST GRACIOUS, THE MERCIFUL”, this report was completed within the stipulated time.

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ABSTRACT

Entre-Hub is a system where UiTM Jasin community, students and staffs, do trade and business online. As of today, UiTM Jasin has no online system for trading or business. Thus, this system overcomes the problem by providing UiTM Jasin a medium to do trade and business online. As an addition, most of available business site lack useful interaction. It is believed that social media features can improve user interaction. Entre-Hub is aimed to provide UiTM Jasin with a C2C business system that implements social networking features. This project begins with the study about business practice among UiTM Jasin Community and online selling social media. Then proceed with identifying a suitable business models and web application development types for closed community online selling. After sufficient information gathered, the project enters the designing and developing phase of the web application using the identified business model and web application development type. The methodology used for the development of the web application is the System Development Life Cycle (SDLC). The SDLC consist of six phases of development; Planning, Defining, Designing, Building, Testing, and Deployment. Pre-survey is conducted to gather user requirements for the system. The SDLC acts as a guide to develop the system to complement the user requirements. The system is then tested using functionality test before deployment. After the system is deployed, it is then evaluated using User Acceptance Test (UAT). Even though the system is successfully deployed, it still can be further improved in the future. The improvement of security of the system is particularly recommended. As an addition, payment gate is not available for the system due to security reason and that can also be improved in the future.

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CHAPTER 1

INTRODUCTION

This paper consists of research about business systems where focused community can sell goods and interact with each other. The lack of business system in UiTM Jasin where students or staffs could sell goods — such as used books, equipments, services, etc. — between themselves unless met directly which leads to the start-up of this project. The advent of online business platform became the initiative taken to develop a system where students or staffs of UiTM Jasin could trade their goods online.

1.1 Project Background

The primary purpose of this project is to provide UiTM Jasin with a community focused business system where users (students/staffs) could trade their goods amongst each other. A system which allow users interact with each other to perform businesses.

The concept of online business has long since developed to simplify business between sellers and buyers, but most of them either too widespread for public use (worldwide) or lack the interaction between sellers and buyers (Jourdan, & Ingram, 2013). Due to this case, a specific system for business is a need when focused community is involved.

This system will link up with social media — facebook.com, twitter — where the sellers can promote or advertise their goods. On the other hand, buyers can share the goods being sold on the web application (this system) on their social page. Thus, the spreading of the info regarding goods being sold will reach most UiTM Jasin users through social media.

The search function will provide users the easiness to navigate through the web application by categorising each product. The implementation of “featured item by users” elements also further enhance the interaction of the web application. As additions, features such as tag and flag are implemented and integrated for users convenient in browsing goods or services on the web application.

Furthermore, the advent of mobile gadgets became a phenomenon where users now owned at least one mobile gadget for each person. Heterogeneous mobile web application has also been implemented to the system as to enable the users to access from mobile gadgets.

1.2 Problems Statement

- **Lack of medium for business on the net for UiTM Jasin.**

Although there are abundant business services and business platforms on the net, but unfortunately most of them are aimed towards public users all around the world. Those web application systems are made to compliments the needs of world users generally (Alt & Österle, 2013). The need of community focused business system particularly UiTM Jasin users (students/staffs) is critical.

Users in UiTM Jasin, especially students who is about to graduate, surely owned used educational materials they want to sell to their juniors. Some students may provide services — such as printing, binding, computer maintenance, etc. — or even staffs may want to sell reference books. But without the right medium to sell their goods or services, unless met face to face, business trade is unable to be performed. Thus, a business system where the community of UiTM Jasin can do business is indeed a need.

A business system focused on UiTM Jasin community will enable users (students/staffs) do business easily. With such web application students or staff would only just needed to advertise their goods or services on the web application and people who access these pages can then link the pages on their social media page

(fb, twitter). In such situation, the opportunity of revenue will rise as the news about the advertised goods spread across their friends or subscribers (Jara, et al., 2013).

From another perspective, sellers (students/staffs) can easily sell their goods without so much a hassle as to meet customers in person. On the other hand, buyers (students/staffs) can share information about goods posted by the sellers among their friends just by sharing it by linking it into their social media page (fb, twitter).

- **Most of business system web application lack useful interaction.**

Business system web application available on the net, except for well-established web application — ebay.com, amazon.com, etc. — especially local within Malaysia — mudah.my, lelong.my, lowyat.net, etc. — lack the interaction features, such as category, tag, flag, featured item, advanced search, and share link. Without such features, the web application will not attract visitor, thus, decreases the marketing and revenue opportunity (Gosai, et al., 2003). Interactive business system web application is vital in order to make sales proficiently (Stewart & Pavlou, 2002).

Features like category, tag, and featured item will make selling goods or services easy. With such features, sellers can categories their goods or services accordingly. On the other hand, buyers will only need to browse goods or services that they need simply by picking the category or searching tag that they want. Featured item feature will enable buyers to know what items are being recommended by other users. Whereas flag feature, can help user differentiate which products are suspicious or not recommended. Unfortunately, such features only available on well-established web application. Minority web applications particularly within Malaysia lack those features.

- **Social media sites can improve user interaction.**

Researches have proven that social media plays a vital role in marketing. Businesses that take advantages of social media improve significantly whether in revenue or

increasing in the number of customers (Sa & Orihuela, 2013). Thus, reinforcing the idea of social media is the best platform for marketing method.

Business system web application implementing social media features in this case refers to the ability of the web application in interacting with users on the system. Such features, as of currently available on the net, are only implemented in well-established web applications.

1.3 Aim

To provide the community of UiTM Jasin with a C2C business system that implements social networking features.

1.4 Objectives

- To study about business practice among Uitm Jasin Community and online selling social media.
- To identify a suitable business models and web application development types for closed community online selling.
- To design and develop a web application using the identified business model and web application development type for UiTM Jasin community.

1.5 Scope of Project

- This project focused on C2C business model online selling.
- The users intended for this system include students and staffs in a closed community which is UiTM Jasin.
- Technology used for this system is based on heterogeneous mobile web application.

1.6 Project Significance

- C2C business system model implementation.
- Enable users to easily sell or buy goods or services online.
- Simplified interfaces and features for users' convenience.
- Heterogeneous web mobile application.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

This chapter consists of research about customer-to-customer (C2C) business system where focused community, in this research MARA University of Technology (UiTM) Jasin, can sell goods and interact with each other. The lack of business system in UiTM Jasin where students or staffs could sell goods — such as used books, equipments, services, etc. — between themselves unless met directly which leads to the start-up of this project. The advent of online business platform became the initiative taken to develop a system where students or staffs of UiTM Jasin could trade their goods online. Loads of online service available on the net regarding this matter, but most of them are not community focused instead focus on public usage. Based on researches done by previous researchers, this chapter consist the details on literature review regarding this project.

2.2 Business and Marketing

The term “business” or “trade” generally includes any activity carried on for the production of income from selling goods or performing services. There are many definitions of marketing but one of the simplest suggests that: "Marketing is getting the right product or service in the right quantity, to the right place, at the right time and making a profit in the process" (Uehara & Yoshida, 2009). Marketing is about identifying and understanding your customer and giving them what they want. It's not just about advertising and promoting your business. Effective marketing is a result of examining every aspect of your business and how it affects the consumer's end experience. It covers everything you'll need to do in order to deliver your products and services to the consumer including research, planning, pricing, packaging, promotion, selling and distribution.

Business marketing is the practice of individuals or organizations (i.e., commercial businesses, governments, and institutions) promoting and selling products and/or services to other organizations (Varadarajan & Yadav, 2002). These organizations resell or use these products and services to support their operations. Companies that act as suppliers or manufacturers may also integrate other business products into their own product offering to improve performance and functionality. Unlike a consumer, who makes a purchase based on individual needs and desires, businesses appoint individuals who act on behalf of the organization.

Marketing is essentially anything you do to promote and grow your business, including advertising, publicity, sales, merchandising and distribution. In this day and age, you basically have two categories in which to choose for your marketing environment — through traditional marketing and Internet marketing (e-commerce) (Watson, et al., 2002). There is an ongoing battle between these types of marketing. Which is better? Which offers greater benefit and value? The truth is, both methods can be useful. However, the key to making the right allocation of marketing funds is properly understanding your target market and the advantages and disadvantages of each type of marketing.

2.2.1 Traditional Commerce (Brick and Mortar)

Traditional marketing utilizes strategies like direct sales, TV, radio, mail, print advertising (like magazines, coupon books, billboards, etc.) and printed promotional materials like catalogues or brochures (often referred to as collateral) (Varadarajan & Yadav, 2002). Research has been done and it is found that there are advantages and disadvantages to traditional marketing in business (Uehara & Yoshida, 2009).

According to the authors, one of the advantages that the traditional marketing offers is that traditional methods may be the only means of reaching particular group of consumers. For instance, if interested in targeting retiring CEOs, much of this demographic isn't utilizing the internet or social media channels. Another advantage, person-to-person selling is considered by many a strategy of traditional marketing. There is definitely a time and place when this type of direct selling is the most effective way to market a product or service. Additionally, the advantage of tangibility, traditional marketing offers hard copy material. There is something to be said about handing a consumer some tangible printed material they can flip through at their leisure.

On the other hand, the authors also stated some of the disadvantages to traditional marketing in their research. The first one is that it can be expensive and cost prohibitive. Purchasing advertisement for TV, radio or print can be very costly prohibitive to most small businesses. Printing hard copy brochures, business cards and mailers is expensive. Furthermore, it usually requires outside help. Printing materials, buying media and creating radio advertisements all require hiring outside help, which adds to costs. Secondly, traditional marketing make it difficult to track results. It is a lot like throwing things against the wall and hoping they stick. It is tough to track real quantitative results. Lastly, traditional marketing is usually forced upon the consumer, because they don't necessarily ask for it.

2.2.2 E-Commerce

Internet marketing (e-commerce) is the process of marketing a product or service using the Internet. This can be both for those whose business is derived solely from the Internet and for those who have an actual brick and mortar business but choose to advertise via the Web. E-commerce utilizes strategies like website creation, search engine optimization (SEO), banner ads, social media, pay-per-click advertising and email marketing (Alt & Österle, 2013).

The authors listed several advantages of e-commerce in their works, such as, results are much more measurable, and decisions can be made using both real data and qualitative results. The ability to drill down into your demographics to accurately reach your target market is crucial in marketing and e-commerce offers this. Social media allows you to directly communicate with groups or even individual consumers. E-commerce is inexpensive. Additionally, with e-commerce, data and results are available immediately. It poses the possibility to accomplish some of the internet marketing on your own and the ability to build direct relationships with your customers via social media and communities. This includes the ability to make marketing message changes on the fly.

In the same research, the authors also listed the disadvantage to e-commerce. Those disadvantages include, reliance on customers being highly interactive on the internet. Furthermore, e-commerce can be highly demanding on your time as continuous content must be created, edited, approved and published; comments must be responded to and sites and pages must be maintained. E-commerce also poses the possibility to mismanage or be inconsistent in brand identity in forums, blogs, social media etc.

Based on the type of relationship between different sides of commerce, e-commerce can be categorized in different types (Tuten & Solomon, 2014). Further in the journal, the author describes them more in details.

- **Business-to-business (B2B)**

The author stated that the term "business-to-business" was originally coined to describe the electronic communications between businesses or enterprises in order to distinguish it from the communications between businesses and consumers (B2C). It eventually came to be used in marketing as well, initially describing only industrial or capital goods marketing. Today it is widely used to describe all products and services used by enterprises. According to the author, many professional institutions and the trade publications focus much more on B2C than B2B, although most sales and marketing personnel are in the B2B sector.

- **Business-to-customer (B2C)**

Stated in the journal, business-to-consumer (B2C, sometimes also called Business-to-Customer) describes activities of businesses serving end consumers with products and/or services. An example of a B2C transaction would be a person buying a pair of shoes from a retailer. However, the sale of the shoe from the shoemaker to the retailer would be considered a (B2B) transaction. The author emphasised that, while the term e-commerce refers to all online transactions, B2C stands for "business-to-consumer" and applies to any business or organization that sells its products or services to consumers over the Internet for its own use. When most people think of B2C e-commerce, they think of Amazon, the online bookseller that launched its site in 1995 and quickly took on the nation's major retailers. In addition to online retailers, B2C has grown to include services such as online banking, travel services, online auctions, health information and real estate sites. Peer-to-peer sites such as Craigslist also fall under the B2C category.

- **Customer-to-customer (C2C)**

From the same journal, described by the author, consumer-to-consumer (C2C) (or citizen-to-citizen) electronic commerce involves the electronically-facilitated transactions between consumers through some third party. A common example is the online auction, in which a consumer posts an item for sale and other consumers bid

to purchase it; the third party generally charges a flat fee or commission. The sites are only intermediaries, just there to match consumers. They do not have to check quality of the products being offered. In the journal, consumer-to-consumer (C2C) marketing is the creation of a product or service with the specific promotional strategy being for consumers to share that product or service with others as brand advocates based on the value of the product. The investment into concepting and developing a top of the line product or service that consumers are actively looking for is equitable to a Business-to-consumer (B2C) pre-launch product awareness marketing spend. This type of e-commerce is expected to increase in the future because it cuts out the costs of using another company. According to the author, an example cited in Management Information Systems, is for someone having a garage sale to promote their sale via advertising transmitted to the GPS units of cars in the area. This would potentially reach a larger audience than just posting signs around the neighbourhood.

2.2.3 Customer-to-customer (C2C)

To further the study on this type of e-commerce, another journal is referred. From the research done in the journal, the authors found and stated that, customer-to-customer (C2C) is a business model that facilitates an environment where customers can trade with each other (Stewart & Pavlou, 2002). Customer-to-customer marketing has soared in popularity with the arrival of the internet, as companies such as eBay, Craigslist and other sites have fostered greater interaction between customers. Customer-to-customer sites make their money from fees charged to sellers for listing items for sale, adding on promotional features and completing transactions; also known as consumer to consumer, or C2C. Further described in the journal, C2C transactions generally involve products sold through a classified or auction system. Products sold are often used or second hand. C2C is projected to grow in the future because of its cost-effectiveness, i.e. it minimizes the cost of using third parties. Retailers see it as very important, given the growing use of social media channels by consumers to share their opinion about a specific stock, which often drives increased traffic to stores (Román & Cuestas, 2008).

In a recent journal, the author stated that, most current C2C sites, such as eBay, and new comer Haute-Trader have both streamlined and globalized traditional person-to-person trading, which was usually conducted through such forms as garage sales, collectibles shows, flea markets and more, with their web interface. This facilitates easy exploration for buyers and enables the sellers to immediately list an item for sale within minutes of registering (Petrovic, 2010).

In another journal, regarding auctioning process, the author described the details as when an item is listed on a C2C site, a non-refundable insertion fee is charged based on the seller's opening bid on the item. Once the auction is completed, a final value fee is charged. This fee generally ranges from 1.25 percent to 5 percent of the final sale price. After the C2C site sets up the system in which bids could be placed, items can be put up for sale, transactions can be completed, seller fees are charged, and feedback can be left, while the C2C site stays in the background. For example, at the end of an auction, the C2C site notifies the buyer via e-mail that he or she has won. The C2C site also e-mails the seller to report who won and at what price the auction finished. At that point it's up to the seller and buyer finish the transaction independently of the C2C site (Shun, 2012).

Many C2C sites have expanded and developed existing product categories by introducing category-specific bulletin boards and chat rooms, integrating category-specific content, advertising its service in targeted publications and participating in targeted trade shows. eBay specifically has also broadened the range of products that it offers to facilitate trading on the site, including payment services, shipping services, authentication, appraisal, vehicle inspection and escrow services (Petrovic, 2010). The author further emphasised that, specialty marketplaces have also been added to serve the specialized needs of buyers and sellers. For example eBay Motors serves the automotive marketplace, including vehicles, parts and accessories; and Half.com is focused on providing a fixed-price trading environment, initially for books music, videos and video games.

2.2.4 Marketing Types

There are many types of marketing in e-commerce. Based on researches done and journals reviewed, it is found that there are four most common types of marketing in e-commerce. Further details are as described.

- **Advertisement**

Traditionally, advertisements are done manually through the distribution of flyers, banners, buntings, etc. Some of them also include mass media, such as radio, television, etc. But nowadays, with the use of internet, advertising took a whole new approach by fully utilising the net to reach consumers through the net. According to a research, e-Marketing online and advertising online reaches consumers significantly higher in number compared to the traditional method (Barajas et al., 2012). There are many frameworks available for advertising on the net — e.g. Google, provided advertisement frameworks (AdSense, Google Ads, etc.) — tied to displaying advertisements in the form of banners or popups when users visit a web page.

Recently, due to the advent of social media, advertisements are now being made through this medium to reach consumers. A research has proven this claim and stated that, with social media advertisements are sure to reach more consumers (Jara et al., 2013). In addition, while reaching to a huge number of consumers, it also increases the revenue opportunities for businesses. Using social media frameworks in advertising is also proven to be effective on another research, and stated that it has become a trend for businesses to use such method in advertising their products of services (Holtzblatt, et al., 2012).

- **Auction**

Despite the success of eBay, numerous other online auction sites have either shut down or consolidated with other similar sites. Creating an innovative and efficient business model is vital towards success. Online auctions can be categorized into five main models: C2C, B2C, B2B, B2G, and G2P (Shun, 2012). C2C refers to customer

to customer, B2C signifies business to customer, B2B refers to business to business, B2G signifies business to government, and G2P refers to government to public. In recent years, online auctions have even appealed to major businesses. For instance, Sears has reported selling items at higher prices on these auctions when compared to discounting them in stores.

The success of an online auction site largely depends on six variables: interactivity, product offering, level of trust, rate of growth and adoption, networking, level of commitment, and payment options. Interactions among users are crucial and thus, websites must be accessible and easily navigable. E-mails, community boards, and feedback all aid in increasing the interactivity (Petrovic, 2010). With the growing need for convenience, the variety of products offered can greatly attribute to the client basis. The author stressfully emphasised that, especially with the growing number of online frauds, trust is essential in auction sites. Users must be guaranteed that their personal information will remain secured and that they will receive their purchased product in a perfect condition and in a timely manner. With the fast-paced advancements in technology, auction sites must respond to these changes by staying updated. Moreover, sites also need to constantly search for business opportunities in order to expand their market. A large network of users is also crucial. Having an array of different sellers, buyers, suppliers, and delivery agents will increase the number of users, which would also raise the level of interactivity (Shun, 2012). In addition, forming alliances with different partners will also aid in the site's success. The level of commitment in buyers and sellers also plays a role in the auction's success. Similar to the level of trust, buyers must be ensured that they receive their purchased item, and sellers must actually receive payment. Although most prefer speedy online transactions, it is beneficial to offer different payment options that will accommodate different buyers.

- **Classified**

Internet classifieds are another example of customer to customer marketing. An example of an internet classified company, is www.sellingfree.com (Subramaniam, et al., 2000). Sellingfree.com utilizes the internet to attract a wide customer and

buyer base which employs the website to list and sell items. Since the customer to customer marketing strategy is strongly focused on serving the customer, the business model of www.sellingfree.com is simple: serve the customer first. Utilizing this model, www.sellingfree.com has developed into a prime example of a customer to customer driven 'machine', which focuses on the customer selling to the customer.

Revenues which support the company are derived through subsidiary channels, while maintaining the model and convenience of the site. In fact, Craigslist makes no money off the customer to customer interactions that occur on the classifieds of the website (Gosain et al., 2003). All of their revenue is derived from portion of the website targeted at businesses. Thus, in other words, their revenue is derived solely from their business to customer model utilized by businesses to post jobs and hire new workers. As such, it becomes apparent that companies who focuses on this particular model and, specifically classifieds, whether online or off, are often not focused on profit; but rather, on delivery of the service or product to ensure customer to customer interaction.

- **Social Media and Marketing**

Social media is a great medium for networking in order to gain supporters or building bonds of trustworthiness between businesses and consumers. Social media frameworks implements voting system that can be used as a rating system to rate a business if they are worthy of trust or not. A research has been done to further analyse this matter and proven that besides gaining social network, bond of trust between business and consumers could also developed (Sa & Orihuela, 2013).

Another feature of social media frameworks is that users can directly send message through the Private Message feature without the use of email. In this case, response can be instant, at least faster than traditional email method (Faustino, 2013). The research also stated that chatting is also crucial for fast information exchange which is also vital for businesses environment (Ashworth, 2012).

2.3 Social Media Marketing

Social media marketing is the process of gaining website traffic or attention through social media sites. Social media marketing programs usually centre on efforts to create content that attracts attention and encourages readers to share it across their social networks. The resulting electronic word of mouth (eWoM) refers to any statement consumers share via the Internet (e.g., web sites, social networks, instant messages, news feeds) about an event, product, service, brand or company (Saravanakumar, 2012). When the underlying message spreads from user to user and presumably resonates because it appears to come from a trusted, third-party source, as opposed to the brand or company itself, this form of marketing results in earned media rather than paid media.

Unlike traditional media that are often cost-prohibitive to many companies, a social media strategy does not require astronomical budgeting. To this end, companies make use of platforms such as Facebook, Twitter, YouTube and Instagram in order to reach audiences much wider than through the use of traditional print/TV/radio advertisements alone at a fraction of the cost, as most social networking sites can be used at no cost (Sa & Orihuela, 2013). This has changed the ways that companies approach interact with customers, as a substantial percentage of consumer interactions are now being carried out over online platforms with much higher visibility.

As stated in a research, people use social media because of its features and its interactivity (Tuten, et al., 2014). It is safe to state that, implementing social media features to any site, in this case business platforms, should garner more customers to the site. As of today, many business companies utilize social media because of its features. Aside from big companies like Amazon.com and EBay, small business also started to utilize social media for the same reason; the features provided by the social media.

These features are what make social media special and interactive. A research proven that interactivity is what makes a site interesting and attracts more users (Jara, et al.,

2013). Each social media has its own features that make it unique. Also stated in the research are the three most popular social media on the net now. These are the most popular social media as of today; Twitter, Facebook, and Instagram.

2.3.1 Twitter

Twitter allows companies to promote their products in short messages limited to 140 characters which appear on followers' home pages. Messages can link to the product's website, Facebook profile, photos, videos, etc (Saravanakumar, 2012). In another research, the author stated that, users can group posts together by topic or type by use of hash-tags – words or phrases prefixed with a "#" sign. Similarly, the "@" sign followed by a username is used for mentioning or replying to other users (Faustino, 2013). These two research papers agree that the features provided by Twitter are what contribute it to be the top ranked social media.

By utilizing the features, the advents of promoting and doing businesses using Twitter suddenly arise. Many of these online businesses use the tagging feature to promote their product or services on Twitter. Figure 2.1 shows online businesses that use Twitter for selling their products or services.

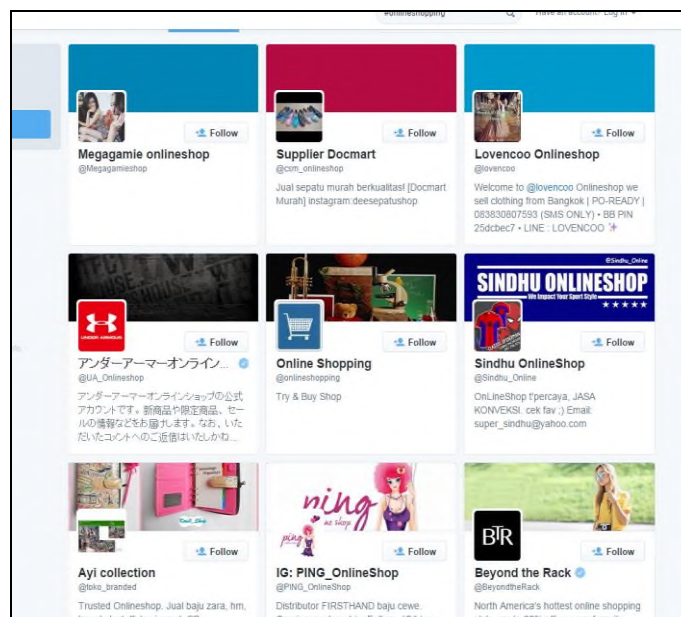


Figure 2.1 - Twitter Online Shopping

The online businesses shown in Figure 2.1 utilize the “#” sign hash-tag features in their post to promote their businesses. Hash-tagging will group posts with the same hash-tag and display it to the users. Figure 2.2, Figure 2.3, and Figure 2.4 show the posts that has been grouped by same hash-tag “#onlineshopping”.

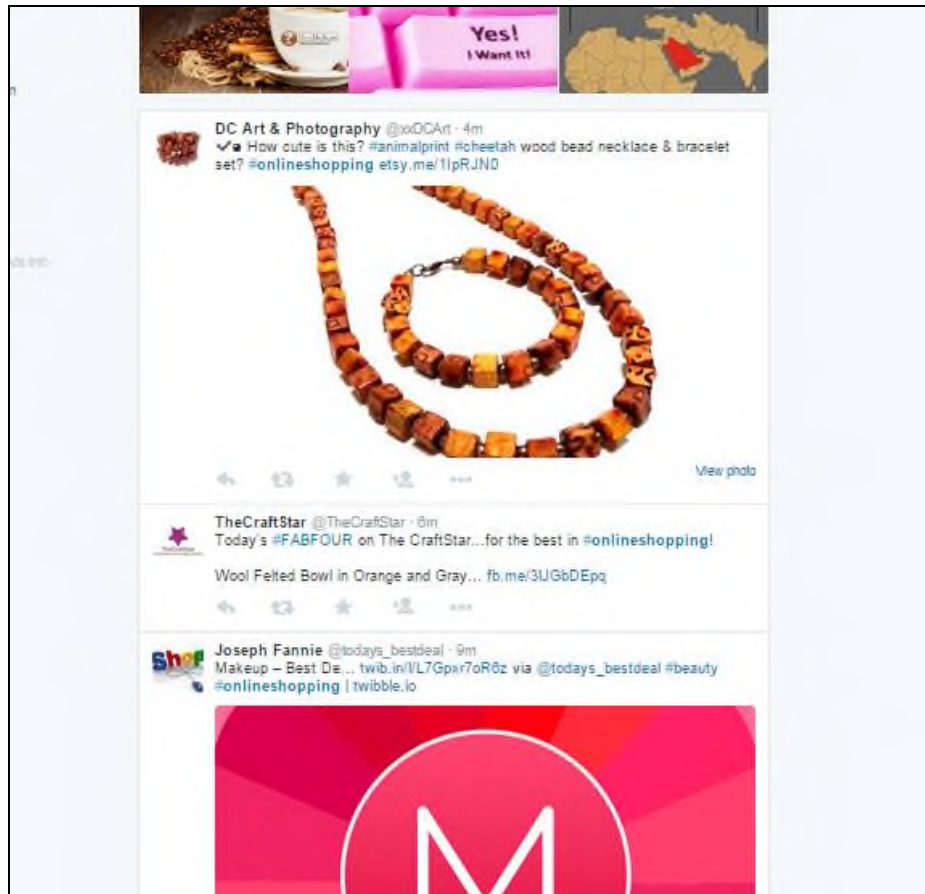


Figure 2.2 - Posts with "#onlineshopping" tags

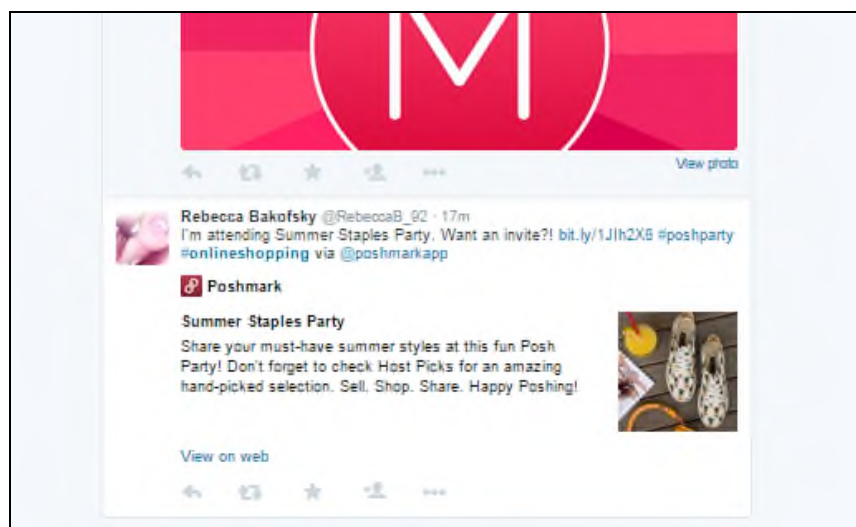


Figure 2.3 - Posts with "#onlineshopping" tags (continued)

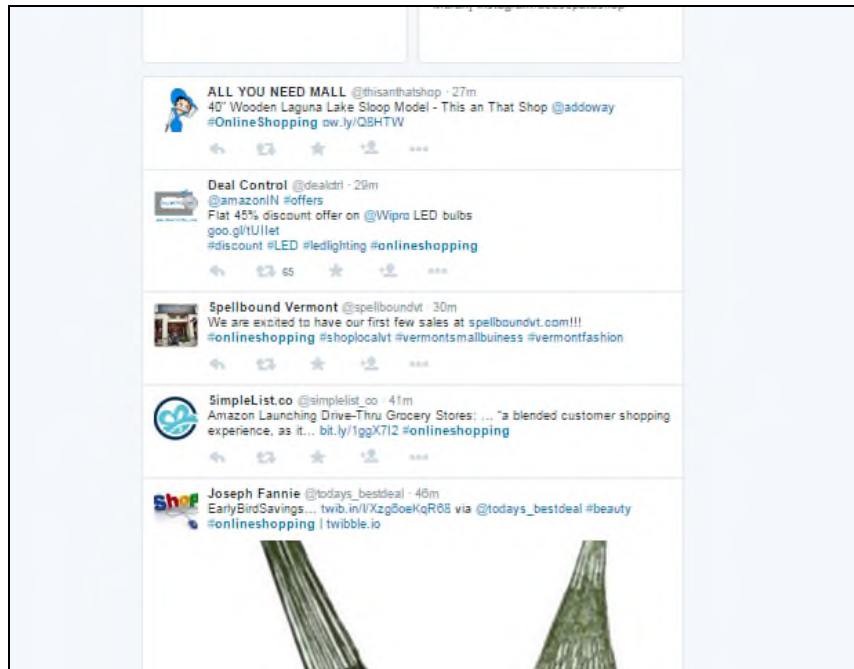


Figure 2.4 - Posts with "#onlineshopping" tags (continued)

The “#” sign hash-tag is useful for customers to group similar products or services provided by businesses with the same tag. These two features (“#” sign tag and “@” sign tag) are fully utilized by online businesses that use Twitter in selling their products or services.

2.3.2 Facebook

Facebook pages are far more detailed than Twitter accounts. They allow a product to provide videos, photos, and longer descriptions, and testimonials as other followers can comment on the product pages for others to see. Facebook can link back to the product’s Twitter page as well as send out event reminders (Saravanakumar, 2012).

A bit of history of the one particular feature unique to Facebook, the new Messaging platform, as stated by the author, codenamed "Project Titan", was launched on November 15, 2010 (Faustino, 2013). Described as a "Gmail killer" by some publications, the system allows users to directly communicate with each other via Facebook using several different methods (including a special email address, text messaging, or through the Facebook website or mobile app) — no matter what

method is used to deliver a message, they are contained within single threads in a unified inbox. Further detailed by the author, users can adjust from whom they can receive messages — including just friends, friends of friends, or from anyone. Email service was terminated in 2014 because of low uptake. Aside from the Facebook website, messages can also be accessed through the site's mobile apps, or a dedicated Facebook Messenger app.

For online businesses, this Messaging platform nowadays is found widely used by users to conduct businesses on Facebook (Jara, et al., 2013). From sellers' perspective, they simply post products or services they wanted to sell on the site. On the other hand, the buyers would only need to send a message to the sellers to ask for the details on the products of services. Figure 2.5 shows online shopping on Facebook.



Figure 2.5 - Business Facebook

Business Facebook is a group page where users post their products or services for users to view. Figure 2.6 and Figure 2.7 show examples how products or services are displayed on the page.

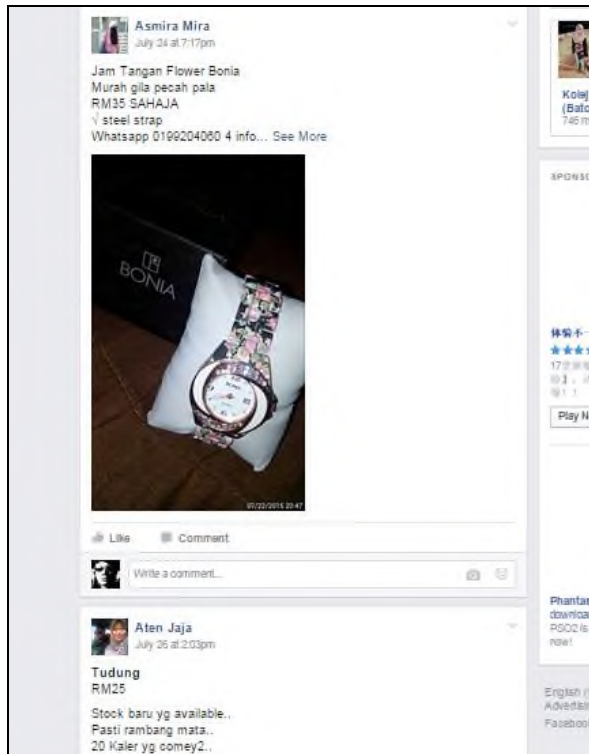


Figure 2.6 - Item Posts Listing



Figure 2.7 - Item Posts Listing (continued)

Figure 2.8 shows another display view of items posted on the page. While the first two example are the detailed view of item listing, the following shows compact view with the details is not displayed.

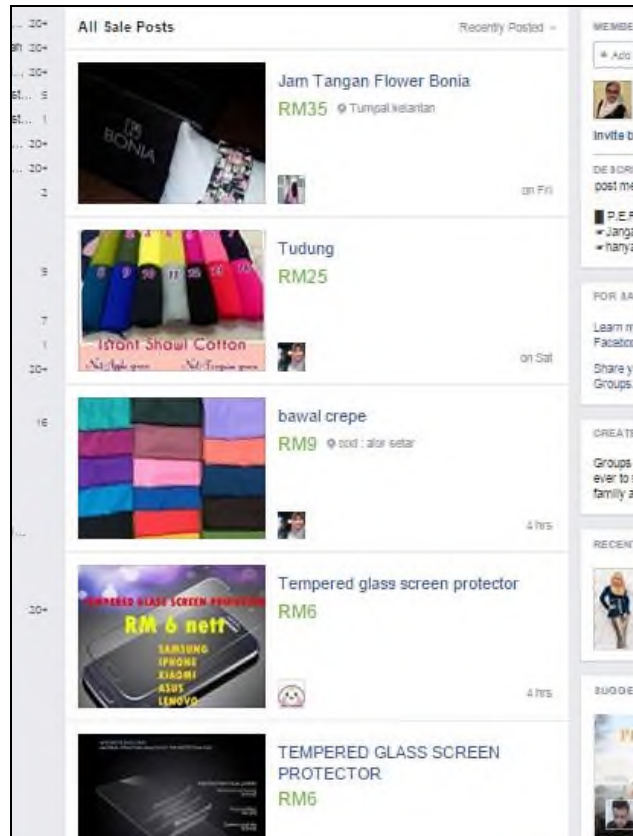


Figure 2.8 - Item Posts Listing (continued)

The products or services are posted by sellers on the site and buyers just need to simply send a message to the sellers for further details of items. By sending a message to the sellers, they will be notified instantly. Then sellers and buyers can communicate with each other. There are also sellers who leave their other info for another method as to be contacted.

2.3.3 Instagram

Many brands are now heavily using this mobile app to boost their visual marketing strategy. Instagram can be used to gain the necessary momentum needed to capture the attention of the market segment that has an interest in the product offering or services (Sa & Orihuela, 2013). As Instagram is supported by Apple and android

system, it can be easily accessed by smart phone users. Moreover, it can be accessed by Internet as well. Furthermore, marketers are also using the platform to drive social shopping and inspire people to collect and share pictures of their favourite products.

Instagram has proven itself a powerful platform for marketers to reach their customers and prospects through sharing pictures and brief messages. Cited by the author, according to a study by Simply Measured, 71 percent of the world's largest brands are now using Instagram as a marketing channel (Jara, et al., 2013). For companies, Instagram can be used as a tool to connect and communicate with current and potential customers. The idea of Instagram pictures lies on on-the-go, a sense that the event is happening right now and that adds another layer to the personal and accurate picture of the company. Another option Instagram provides the opportunity for companies to reflect a true picture of the brand through the perspective of the customers, for instance, using the user-generated contents through the hash-tags encouragement. The author also stated that, other than the filters and hash-tags functions, the Instagram's 15-second videos and the recently added ability to send private messages between users have opened new opportunities for brands to connect with customers in a new extent, further promoting effective marketing on Instagram.

Based on the research, it is mentioned that the idea users can share pictures on-the-go and utilizing the hash-tag filters on Instagram would help open a new marketing opportunities for companies. This situation resulted in the rising of Instagram online shopping where users utilize its features to do online businesses (Sa & Orihuela, 2013). These online businesses take advantage of sharing pictures on-the-go and hash-tag filters to sell their products or services.

Focusing on the hash-tag featured by Instagram, it is of similar function of use as featured by Twitter (see 2.3.1 Twitter). Hash-tagging on Instagram also allows users to define custom filters simply type any words with the “#” sign as the pretext. These tags acts the same way that it groups similar post with the same tag. On the other hand, sharing pictures on-the-go allows sellers to easily post the pictures of their products or services on Instagram. By browsing through the sellers' posted pictures, Instagram provide the easy viewing gallery view for the picture. With gallery view

feature, it allows buyers to browse through the pictures of products or services posted by sellers with ease. Figure 2.9 show example of Instagram online shop.

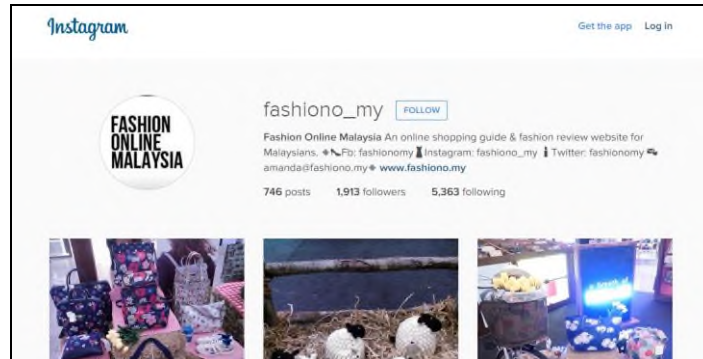


Figure 2.9 - Instagram Online Shop (fashiono_my)

The figure shows an online shop on the Instagram, fashiono_my. The shop fashiono_my post the pictures of their products and services on intagram for interested customers to follow. The pictures viewed by the customers is displayed in gallery view. Figure 2.10 shows how gallery view is displayed.

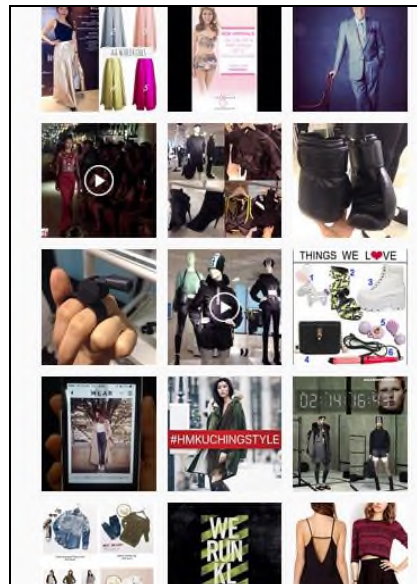


Figure 2.10 - Instagram Gallery View (fashiono_my)

The figure shows the gallery view that displays all pictures of products or services posted by fashiono_my in a compact and easy to view display. This feature allows interested customers to view the pictures with ease.

2.4 Web Applications

A web application or web app is any program that runs in a web browser. It is created in a browser-supported programming language (such as the combination of JavaScript, HTML and CSS) and relies on a web browser to render the application.

Web applications are popular due to the ubiquity of web browsers, and the convenience of using a web browser as a client, sometimes called a thin client. The ability to update and maintain web applications without distributing and installing software on potentially thousands of client computers is a key reason for their popularity, as is the inherent support for cross-platform compatibility. Common web applications include webmail, online retail sales, online auctions, wikis and many other functions (Schmohl, et al., 2007).

The authors further added, through Java, JavaScript, DHTML, Flash, Silverlight and other technologies, application-specific methods such as drawing on the screen, playing audio, and access to the keyboard and mouse are all possible. Many services have worked to combine all of these into a more familiar interface that adopts the appearance of an operating system. General purpose techniques such as drag and drop are also supported by these technologies. Web developers often use client-side scripting to add functionality, especially to create an interactive experience that does not require page reloading. Recently, technologies have been developed to coordinate client-side scripting with server-side technologies such as PHP. Ajax, a web development technique using a combination of various technologies, is an example of technology which creates a more interactive experience.

The mobile web refers to access to the World Wide Web, i.e. the use of browser-based Internet services, from a handheld mobile device, such as a smartphone or a feature phone, connected to a mobile network or other wireless network.

Traditionally, access to the Web has been via fixed-line services on laptops and desktop computers. However, the Web is becoming more accessible by portable and wireless devices. An early 2010 ITU (International Telecommunication Union)

report said that with the current growth rates, web access by people on the go — via laptops and smart mobile devices – is likely to exceed web access from desktop computers within the next five years (Gaedke & Beigl, 1999). According to the authors, the shift to mobile Web access has been accelerating with the rise since 2007 of larger multitouch smartphones, and of multitouch tablet computers since 2010. Both platforms provide better Internet access, screens, and mobile browsers- or application-based user Web experiences than previous generations of mobile devices have done. Web designers may work separately on such pages, or pages may be automatically converted as in Mobile Wikipedia.

Added further, the distinction between mobile Web applications and native applications is anticipated to become increasingly blurred, as mobile browsers gain direct access to the hardware of mobile devices (including accelerometers and GPS chips), and the speed and abilities of browser-based applications improve. Persistent storage and access to sophisticated user interface graphics functions may further reduce the need for the development of platform-specific native applications.

The Mobile Web has also been called Web 3.0, drawing parallels to the changes users were experiencing as Web 2.0 websites proliferated (Schmohl, et al., 2007).

Mentioned in the research, Mobile Web access today still suffers from interoperability and usability problems. Interoperability issues stem from the platform fragmentation of mobile devices, mobile operating systems, and browsers. Usability problems are centred on the small physical size of the mobile phone form factors (limits on display resolution and user input/operating). Despite these shortcomings, many mobile developers choose to create apps using mobile Web.

2.4.1 Native Web Application

Native App has been developed for use on a particular platform or device. .A native mobile app is a Smartphone application that is coded in a specific programming language, such as Objective C for iOS and Java for Android operating systems. Native mobile apps provide fast performance and a high degree of reliability. They

also have access to a phone's various devices, such as its camera and address book. In addition, users can use some apps without an Internet connection (Coin, 2014). However, according to the author, this type of app is expensive to develop because it is tied to one type of operating system, forcing the company that creates the app to make duplicate versions that work on other platforms. Most video games are native mobile apps.

Usually, when the term "Mobile App" is mentioned, they assume it to be Native App. This is a program that runs on a handheld device (iPhone, tablet, etc) which has a "smart" operating system which supports standalone software and can connect the internet via wifi or a wireless carrier network (Spriestersbach & Springer, 2004). Usually people download native mobile apps from app stores such as the apple app store or the Android market. A Native app can only be "Native" to one type of mobile operating system (iOS, Android, Blackberry, Symbian, Windows phone, WebOS, etc.).

In the early stages of the Smartphone market, most apps were tailored to the iPhone. However, the market share for Android phones grew, thus, the need for cross-platform functionality became an issue.

2.4.2 Mobile Web Application

Web apps are not real applications; they are really websites that, in many ways, look and feel like native applications, but are not implemented as such. They are run by a browser and typically written in HTML5. Users first access them as they would access any web page: they navigate to a special URL and then have the option of "installing" them on their home screen by creating a bookmark to that page (Cotfas, 2011). Web apps became really popular when HTML5 came around and people realized that they can obtain native-like functionality in the browser. Today, as more and more sites use HTML5, the distinction between web apps and regular web pages has become blurry.

From the same paper, mentioned by the author, in 2011 Financial Times withdrew its native app from Apple's App Store to circumvent subscription fees and maintain closer connection with their subscribers. Instead, it came out with an iPhone web app (app.ft.com). Its web app is, in many ways, hard to distinguish from a native app. For instance, there are no visible browser buttons or bars, although it runs in Safari (when accessed from an iPhone). Users can swipe horizontally to move on to new sections of the app. And, due to browser caching, it's even possible to read the newspaper offline.

These are all features that are available in HTML5. Added from another research paper, these features are also available are the GPS, the tap-to-call feature, and, there is talk about a camera API. There are, however, native features that remain inaccessible (at least from now) in the browser; the notifications, running in the background, accelerometer information (other than detecting landscape or portrait orientations), complex gestures (Schmohl et al., 2007).

2.4.3 Hybrid App (Heterogeneous Mobile Web Application)

Hybrid Apps are like native apps, run on the device, and are written with web technologies (HTML5, CSS and JavaScript). Hybrid apps run inside a native container, and leverage the device's browser engine (but not the browser) to render the HTML and process the JavaScript locally. A web-to-native abstraction layer enables access to device capabilities that are not accessible in Mobile Web applications, such as the accelerometer, camera and local storage (Gaedke & Beigl, 1999).

Stated by the authors, hybrid, by definition is anything derived from heterogeneous sources, or composed of elements of different or incongruous kinds. A hybrid app is one that is written with the same technology used for websites and mobile web implementations, and that is hosted or runs inside a native container on a mobile device. It is the integration of web technology and native execution. Often, companies build hybrid apps as wrappers for an existing web page; in that way, they hope to get a presence in the app store, without spending significant effort for

developing a different app. Hybrid apps are also popular because they allow cross-platform development: that is, the same HTML code components can be reused on different mobile operating systems, reducing significantly the development costs. Tools such as PhoneGap and Sencha Touch allow people to design and code across platforms, using the power of HTML.

Generally, there are five categories of hybrid mobile website design methodologies, and each one has its own advantages and disadvantages (Serrano, et al, 2013). Those five categories are; Mobile friendly, Adaptive, Responsive, Experience, and Native (see 2.4.1 Native Web Application).

- **Mobile Friendly:** Mobile friendly is just as it sounds; the site does not contain anything that will break or fail to load if rendered on a mobile device. One can pinch and zoom to hit buttons, read text and access all the sites nifty bells and whistles. Treefrog, by default, builds mobile friendly websites. Nothing will break, everything will load, although it will still feel as if you're trying to look at a page through a keyhole. The iOS7 for iPhone came equipped with a handy tool for Safari (the default web browser on the iOS) that allows viewing the text and images within the main content frame of a website.
- **Adaptive:** Adaptive is a development style that physically changes the design of the site as you resize your window. An adaptive design will re-arrange page elements in relation to the size of the window where it is being displayed. An adaptive design is based on predefined screen sizes. Resizing a window will 'restack' visual elements based on the width of the display. The websites code has been arranged so that it will reorganize content sections to conform to the display size.
- **Responsive:** Responsive web design is sometimes referred to as 'liquid' design. A responsive design conforms to the physical dimensions of the device you are using to view the site. It will literally morph the content in order to save viewers having to zoom in and scroll left or right to read page content. A responsive design can actually resize images and page content sections based on the width of

the screen/device you are using to view it. There are similarities between adaptive and responsive design, however the biggest difference is probably that adaptive web design is based on fixed columns and screen resolution sizes, whereas responsive design is not fixed. Resizing the browser window actually changes the pixel ratio of the images within the frame. This differs from adaptive in the sense that adaptive would not technically resize the images, rather rearrange them into a logical columnar layout depending on the size of the devices screen.

- Experience: An experience mobile site is formatted to display on a specific mobile device. It's a completely separate design, and it often requires a separate content structure. Most mobile sites are pared down to contain only the essentials for a quick, nimble experience. Loading this site on a desktop machine will look strange. Basically, all the content is made to display properly on a mobile device, and is not really supposed to look right on a desktop browser.

2.5 Conclusion

Based on the literature review done, there are many types of business model available in the world. In order to accommodate the needs of UiTM Jasin community to do business online, it is found that a Customer-to-Customer (C2C) business model to be the most suitable model to be implemented into Entre-Hub. For marketing method and strategy, classification and categorisation with search filters method proven by researches as an effective e-commerce marketing strategy alongside the implementation of social media features. Key features of each of the reviewed social media; Hash-tag, Messaging and Gallery View are planned to be built into the system. Last but not least, for the web application technology, hybrid app or heterogeneous mobile web application is chosen. This is because heterogeneous mobile web application technology allows the system to be cross-platform for all devices; computers and gadgets.

CHAPTER 3

METHODOLOGY

3.1 Introduction

This chapter focused on the overview of the implementation of methodology that is suitable for this project; Entre-Hub. Selecting the right and suitable methodology helps developers greatly throughout the development of the system. Methodology that is chosen for this project development is System Development Life Cycle (SDLC). SDLC is a conceptual model used in project management which describes stages that are involved in a system development project, from the initial study through deployment of the completed system. Commonly, several models are combined into some sort of hybrid methodology. Some methods work better for a specific type systems development, regardless in final analysis, the most crucial factor of success may as well be how closely the plan was followed.

3.2 Model Overview

SDLC Model cited from a journal is the foundation methodology that will be implemented for completing this project. Figure 3.1 shows the SDLC Model concept basic phase.

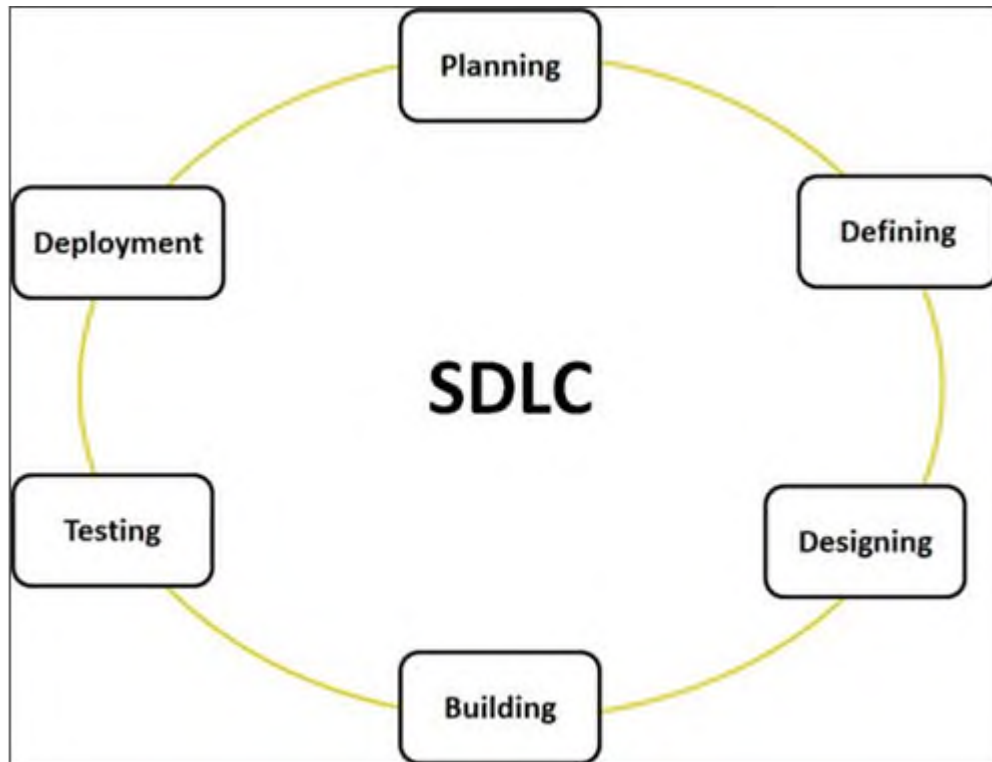


Figure 3.1 - SDLC Model

Based on the above diagram, the methodology of the project activity can be specify easily and progressing smoothly in orderly manner. Furthermore, by preparing the project appropriately, even if there are problems during the development of the project, the error can be detected and repaired without affecting other modules in the progress.

3.3 Phases

Details on the phases are shown in Table 3.1. Each phase has its own Activities and Deliverables by which reflects the Objective Achieved.

Table 3.1 - Phases

Phase	Activities	Deliverables	Objective Achieved
Planning	Literature Review: <ul style="list-style-type: none"> • Business and Marketing, Social Media Marketing, Web Applications 	Research Requirements: <ul style="list-style-type: none"> • Project Scope • Problem Statements • Research Objectives • Research Questions 	<ul style="list-style-type: none"> • Objective 1.
Defining	Identifying user requirements: <ul style="list-style-type: none"> • Gathering of information on the field. • Look for related works on the net. • Research current available systems. 	Results of pre-surveys: <ul style="list-style-type: none"> • Analysis of user requirements. 	<ul style="list-style-type: none"> • Objective 2.
	Identifying application requirements: <ul style="list-style-type: none"> • Personal Computer hardware. • Personal Computer software and tools. • Hosting server and DNS. 	List of application requirements: <ul style="list-style-type: none"> • Hardware and Software. 	
Designing	Interface Design. <ul style="list-style-type: none"> • Graphic User Interface (GUI). Use Case Diagram. Database Design. <ul style="list-style-type: none"> • Entity Relationship Diagram (ERD). Logical and Physical Diagram	<ul style="list-style-type: none"> • System blueprint. 	<ul style="list-style-type: none"> • Objective 3.
Building	Prototyping of the system.	<ul style="list-style-type: none"> • System Prototype 	
Testing and Deployment	Functionality testing. <ul style="list-style-type: none"> • Deploy the system online. 	Complete system: <ul style="list-style-type: none"> • Deployed and tested. 	
Documentation	Report writing.	Final report for the system is documented.	

3.3.1 Planning

Planning phase is important to plan out the activities involved during the whole project. In order to ensure the project follow the course of time, a thoroughly defined plan should be defined. For this project, planning phase involves informational gathering and the understanding of the objective of the project. Throughout this phase, objective acts as a catalyst to keep the flow of the project no run off the correct track. The objectives are as follow; to identify the problems, to design the system and to develop the system respectively. Time allocation for each of the process is further categorized following the methodology chosen, the SDLC Model.

The methods to be taken are finalised and activities are defined. Activities for each phase are scheduled care as to not mess up the whole process. All activities are tabulated according to phases defined in the methodology. The requirements for the system are also identified during the planning phase. This is done as to prepare for the actual requirements during the development phase.

In this phase, literature review takes place where project scope, problem statements, research objectives, and research questions are defined. Materials reviewed are related to the Business and Marketing, Social Media Marketing, and Web Applications. The aforementioned literature review provided the basic concept to the actualisation of this project.

3.3.2 Defining

From the information gathered, analysis of the information is conducted where it involved the analysing of the business systems available on the net and observe any flaws or features that is beneficial to fully utilize the data collected. There are a lot of said systems available on the net, but most of them do not satisfy the requirements obtained from processing the information gathered. Most of the systems are targeted to public and their usage is in a generalised manner. As systems that target a generalised community, such systems are not suitable to be implemented in UiTM Jasin, thus a more specific system must be deployed.

Based on the situation stated, gathering of information on the field of focused community, which is in this project, UiTM Jasin is conducted. The method conducted including surveying the field itself, giving out questionnaire, and through experience itself. Based on information gathered, it is proven that UiTM Jasin is indeed needed a system where people can make business simple and efficient.

Traditional way of making business is undeniably more efficient in making the trade successful and the trade can be guaranteed trusted. But the internet is said to be the suitable medium to reach many customer, thus increase revenue opportunity. Based on the situation aforementioned, most businesses nowadays are seen done through the internet. Thus, this project take such situation to make a business medium where a focused community in specific area, UiTM Jasin to make business.

Students especially in their senior year who have used books or material found it hard to sell them to the juniors who needed them. The same could be said on the staff side, lectures or staffs, who have their own recommended material or reference book to sell to their students. Based on this situation, a solution is needed and that is a system than utilizes the internet is crucial.

- **Pre-Analysis**

The pre-analysis involved surveying 20 random UiTM Jasin community; students and staffs. They were asked to fill a Google document form on what basic functions they would like to be implemented in a C2C business web application including social media features implementation. Table 3.2 shows the sample questions.

Table 3.2 - Pre-Analysis Form

Functions	YES	NO
Advertisement		
Auction		
Bidding		
Classified or Categorised		
Monetary Transaction		
Private Message		
Search Function		
Tagging (#hashtag)		

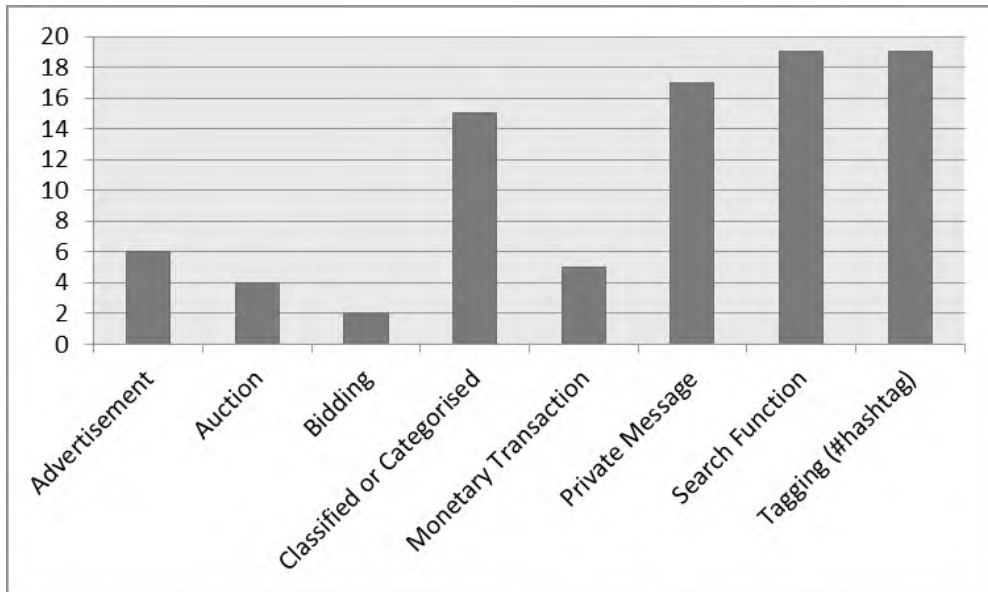


Figure 3.2 - Pre-Analysis Result

Figure 3.2 shows the results of the survey. Only YES votes are counted. Out of 20 respondents surveyed, 15 would like Classification or Categorisation to be implemented. Up to 17 respondents favour implementing Private Message into the web application. Search Function voted favourable by 19 respondents. Tagging(#hashtagging) implementation also favoured by 19 respondents. For the least favourable four functions, Advertisement, Monetary Transaction, Auctioning, and Bidding are voted favourable only by six, five, four, and two respectively.

According to the tabulated results above, most favourable functions to be implemented in a C2C business web application are as follows; Search Functions, Tagging(#hashtagging), Private Messaging, and Classification or Categorisation. Therefore, in the development of Entre-Hub, these features are decided to be implemented into the web application.

- **Requirements**

These are the requirements needed to complete this project. The requirements include hardware and software components needed for developing the system. These components are already purchased before the starting of the project.

Hardware

The hardware in this case, the computer used to design and develop the system. All coding and system development are done on this computer. Table 3.3 shows the specification of the computer.

Table 3.3 - List of Hardware Reuirements

No.	Hardware	Specifications
1.	CPU	Intel Core i5 3470 @ 3.20GHz Ivy Bridge 22nm Technology
2.	Mainboard	ASUSTeK COMPUTER INC. P8Z77-V LX2 (LGA1155)
3.	RAM	8.00GB Dual-Channel DDR3 @ 824MHz
4.	Graphic	2047MB NVIDIA GeForce GTX 650 Ti (Leadtek)
5.	Storage	Western Digital WDC ATA (SATA)

Software

The software used to develop and prototyping the system before deploying. The OS used, coding software, interface development, and databases are all acquired before the beginning of the system development. Table 3.4, shows the list of software used.

Table 3.4 - List of Software Requirements

No.	Software	Description
1.	Windows 7 (OEM)	Ultimate x64 bit
2.	SublimeText2	Source code editor
3.	Dreamweaver CS6	HTML and interface editor
4.	Photoshop CS6	Image processor and editor
5.	XAMPP for Windows	Free open source for cross platform webserver packages
6.	MySQL	Database server

3.3.3 Design

This chapter describes the system design and interfaces of main module of completed Entre-Hub web application. Included in this chapter are System Concept, Context Diagram, Use Case Diagram, Entity Relational Diagram, and User Interfaces. They are further described in each of their own section.

- **System Concept**

The concept of the system is generated after reviewing the C2C business model and the social media features in the Literature Review. The idea of implementing social media features then put into consideration after concluding that by doing it made a system more interactive. With social media features implemented into a C2C model e-commerce system, the system becomes more interactive to the users.

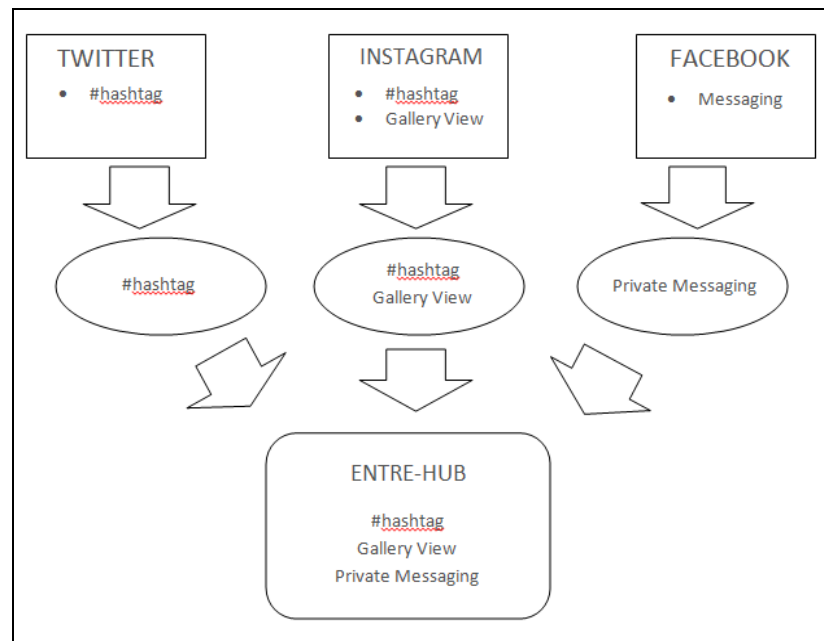


Figure 3.3 - System Concept

Figure 3.3 shows the system concept of Entre-Hub. Key features of social media reviewed in the Literature Review; Hash-tag, Messaging, and Gallery View are to be implemented into Entre-Hub.

- **Context Diagram**

Overall process involved in the system. The system acts as intermediary between sellers and customers. Transaction and monetary process are not conducted through the system. Those transactions occurs on the agreements between users, the system only provide the medium for posting the product on the web application. Figure 3.4 shows the context diagram of the system.

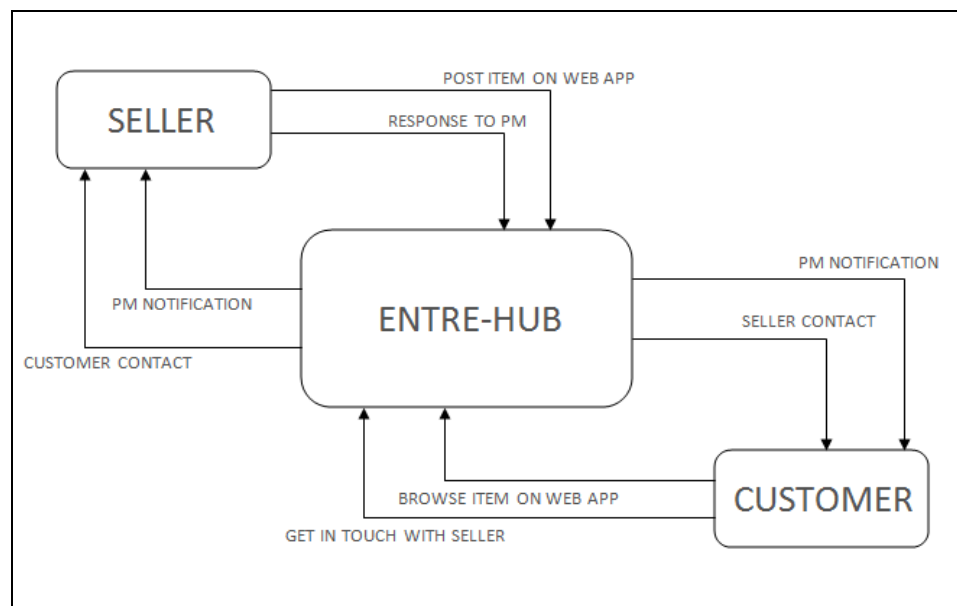


Figure 3.4 - Context Diagram

The seller posts the item that is to be sold on the site. The item details should be provided by the seller to describe the item. Any updates or promotions of the item will be updated by the seller. Customer browses and searches item on the site, then pick item to buy. Customers then contact the seller through the details provided by the seller in the item page description. Seller or customer can also communicate with each other through Private Message feature.

- **Use Case Diagram**

Use case diagram is a type of behavioural diagram which used to present a graphical overview of the functionality provided by a system in terms of actors, their goals (represented as use cases), and any dependencies between those use cases. The main

purpose of a use case diagram is to show what system functions are performed for which actor, so that the roles of each actors in the system can be depicted.

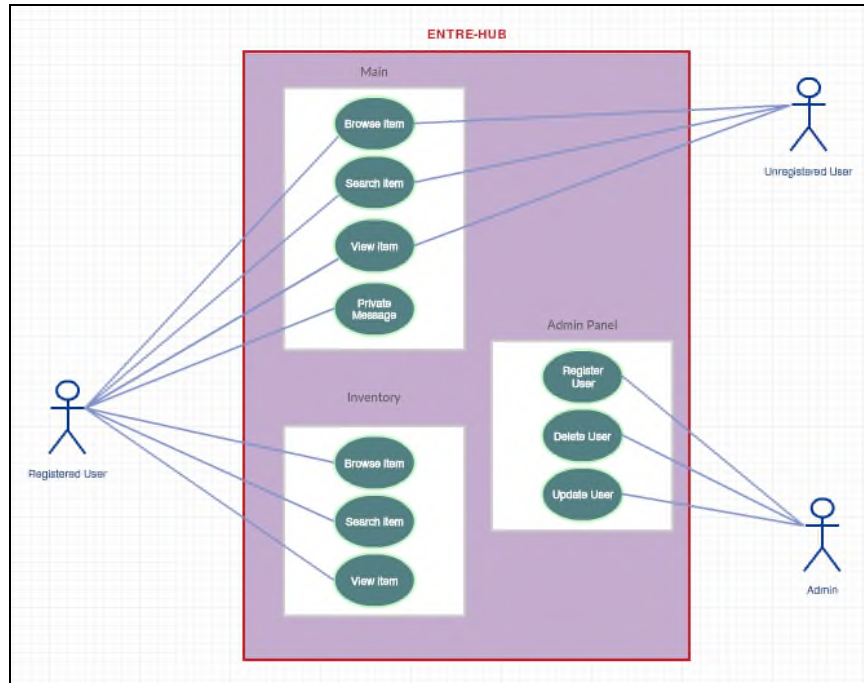


Figure 3.5 - Use Case Diagram

Figure 3.5 shows the use case diagram of Entre-Hub. As an unregistered user, the user is limited to a certain action. User can only browse the site, use the search function, and view items. On the other hand, a registered user can access most of the site. Starting from the main function of the site, registered user can also browse, use the search function, and view items. In addition to those, registered user can also view another registered users profile and send Private Message to them. For inventory function, registered user can add, modify, and delete items from their inventory. For admin, they have their own panel where they can create user, delete user, and update user.

- **Entity Relational Diagram (ERD)**

Figure 3.6 shows the Entity Relational Diagram (ERD) for the whole system.

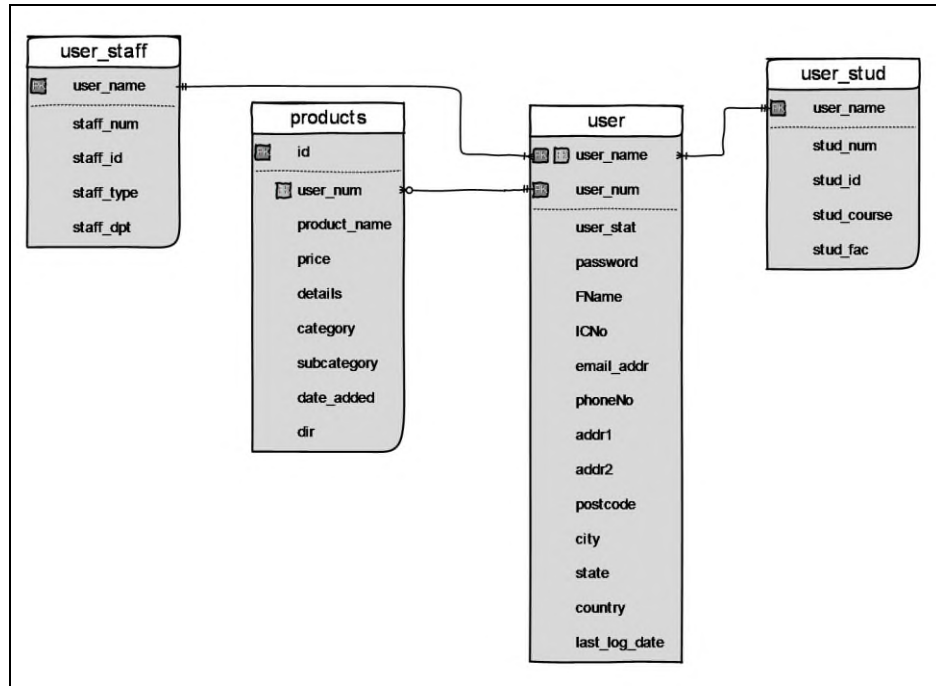


Figure 3.6 - Entity Relational Diagram (ERD)

- **Logical and Physical Design**

Logical and Physical Design of Entre-Hub are the netcentric design of the whole system. Logical Design is virtual representation of the netcentric elements of the system which include Server, Host, and Database location. Physical Design is the actual physical representation of location of Server, Host, and Database for the system.

Figure 3.7 shows the logical design of the whole system. The system is hosted on the internet and the hosting service completely provides the servers and hosted database. The servers provided include Web server, Application server, and also File Server. The system used MySQL database which also provided by the hosting service provider.

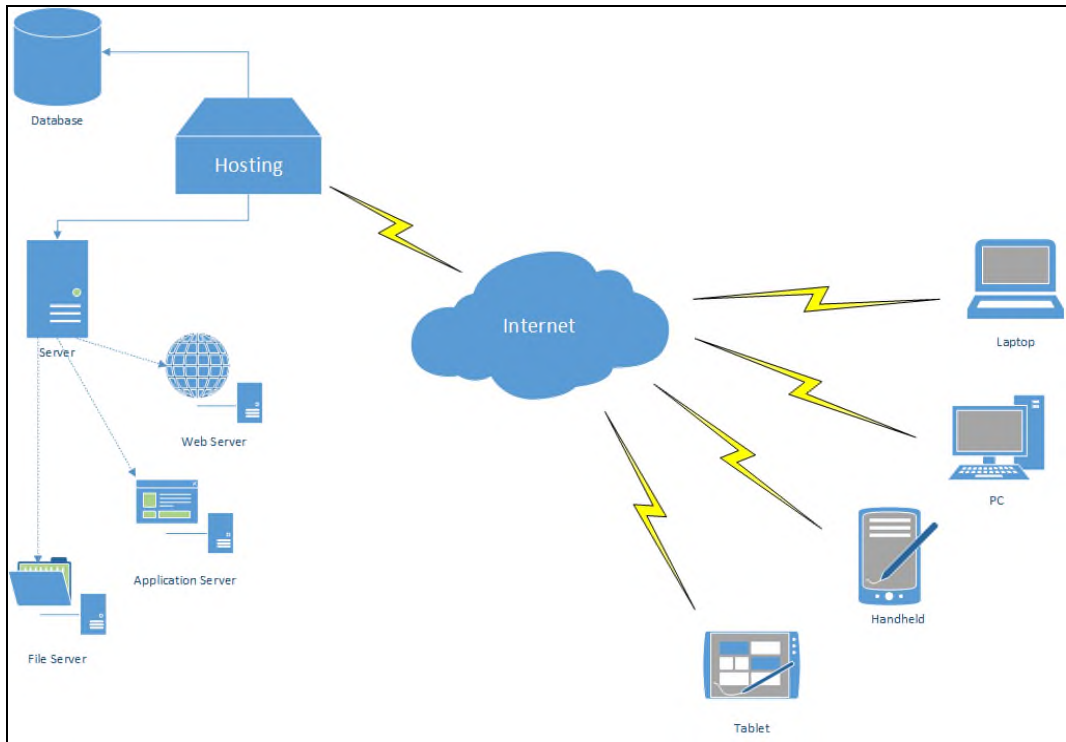


Figure 3.7 - Logical Design

For physical design, as the system used hosting service, only the details of the CPanel are available. The details of the CPanel are available only when accessing the hosting service provider official site.

Website Details	
Access your Website at	http://entrehub.esy.es
Access your Website with www.	http://www.entrehub.esy.es
Preview your website at	Click here
Website IP Address	31.170.165.236
Server Name	server31.hostinger.my

Figure 3.8 - Website Domain

Figure 3.8 shows the details of the Web Server provided. The main site of the system located on this server. The main site of Entre-Hub can be accessed from the domain provided by the hosting service provider as shown in the figure.

E-mail Details	
Webmail Address	http://webmail.hostinger.my
Login Username	User E-mail Address
Password	User E-mail Password
POP3/IMAP Host	mx1.hostinger.my
POP3 Port	110
IMAP Port	143
SMTP Host	mx1.hostinger.my
SMTP Port	2525
Manage E-mail Accounts	Manage E-mails

Figure 3.9 - Email Server

Figure 3.9 shows the Email Server provided by the hosting service. All the emails sent to Entre-Hub are kept and stored on this server.

File Upload Details	
FTP IP	31.170.165.236
FTP Hostname	ftp.entrehub.esy.es
FTP Username	u629428146
FTP Password
FTP Port	21
Folder to Upload Files	public_html
Forgot FTP Password?	Change Account Password
Recommended FTP Clients	SmartFTP or FileZilla

Figure 3.10 - FTP Server

Figure 3.10 shows the FTP server. The FTP server is where all the uploaded pictures are stored. The management of the Website files is also done on this server.

List of Current Databases		
10		<input type="text" value="Search.."/>
Mysql Database	Mysql User	Actions
u629428146_entre	u629428146_root	Enter phpMyAdmin
<input type="button" value="← Previous"/> <input type="button" value="1"/> <input type="button" value="Next →"/>		

Figure 3.11 - Database

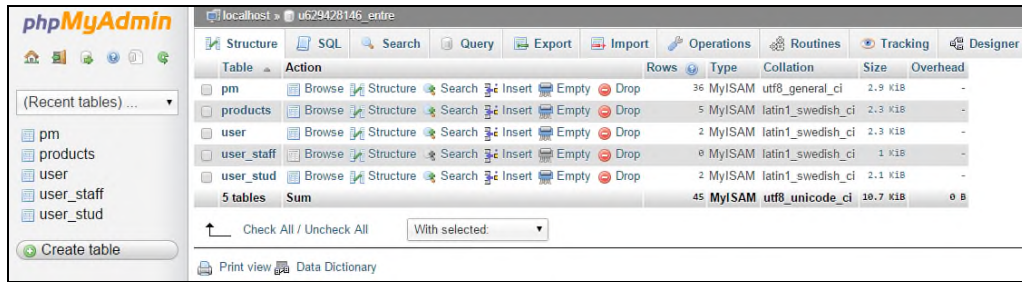


Figure 3.12 - phpMyAdmin Panel (database)

Figure 3.11 and Figure 3.12 show the database and the phpMyAdmin panel respectively. Any data receive during CRUD execution, is stored in the database. The phpMyAdmin panel allows admin to manage the database and data entry.

3.3.4 Development

During this phase, the system is developed. Code is constructed using the software required. Language involved includes PHP, JavaScript, and others like CSS and Bootstrap to enhance the interaction of the system.

Beta-testing is performed by beta-testers volunteered among UiTM Jasin. These beta-testers will send feedbacks to developers for maintenances and improvements of the system.

- **User Interfaces**

In this section, the user interfaces of main module of the system are presented. The modules are My Inventory, Hash-tagging, Product Listing, Search, and Private Message. The code snippets for each user interface are provided accordingly. The following section further explained each of these modules.

My Inventory Module

This module is where registered user manages their inventory of products or services posted on the system. It is divided into two functions; add product and inventory list. Add product is where users fill in form to post their product or service into the

system. On the other hand, the inventory list is where users manage their posted products or services whether to update (edit) or delete them. Figure 3.13 shows Add Product interface while Figure 3.14 shows Inventory List.

The screenshot shows a web form titled "ADD INVENTORY" with a sub-header "Item Details". The form contains the following fields and controls:

- Name:** A text input field with a red asterisk and the placeholder text "Product Name".
- Price (RM):** A text input field with a red asterisk and the placeholder text "00.00".
- Description:** A text area with a red asterisk and the placeholder text "Product Description".
- Category:** A dropdown menu with a red asterisk and the placeholder text "-- Select Category--".
- Subcategory:** A dropdown menu with a red asterisk and the placeholder text "-- Select Subcategory--".
- Hashtag:** A text input field with a red asterisk and the placeholder text "#hashtag".
- Image:** A section with a red asterisk, a "Choose File" button, and a "Browse..." button.
- Add Item:** An orange button located at the bottom center of the form.

Figure 3.13 - Add Product

Add inventory interface contain several text fields to be filled by users regarding the product or service. The fields needed to be filled are; Name, Price (RM), Description, Category, Subcategory, Hashtag, and Image. The Name field, as it suggest is the name of the product or service. Price field is the price tag for the product or service. Description field is where details of product are described for reference. Category and Subcategory are for categorization purpose. Image is where users upload image of their product or service. These fields are mandatory for each products or services to be posted in the system.

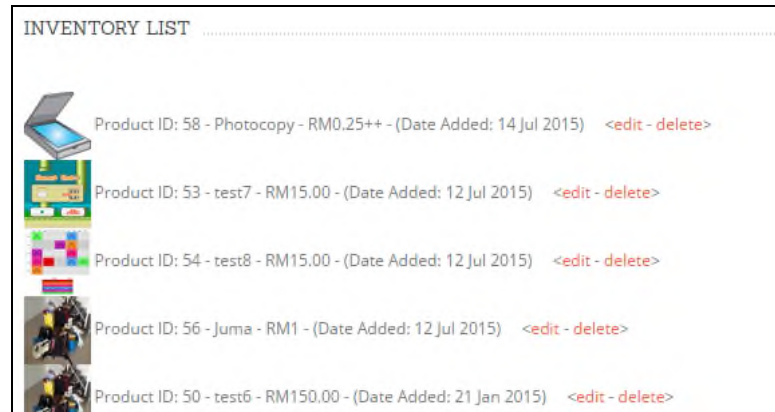


Figure 3.14 - Inventory List

The 'EDIT ITEM' form contains the following fields and controls:

- Product ID:** Text input field containing '58'.
- Name:** Text input field containing 'Photocopy'.
- Price (RM):** Text input field containing '0.25++'.
- Description:** Text area containing 'Photocopy', 'Cheap Bundle', and 'contact: 010-98765432'.
- Category:** Dropdown menu with 'Services' selected.
- Subcategory:** Dropdown menu with 'New' selected.
- Hashtag:** Text area containing '#photocopy #cheap'.
- Image:** 'Choose File' button and 'Browse...' button.
- Buttons:** 'Apply' (orange) and 'Cancel' (grey) buttons at the bottom.

Figure 3.15 - Edit Item (update product)

Inventory list displays the products or services the users have in the system. Users can update or delete the items in the inventory. Figure 3.15 shows the update fields of item. By editing the items, the database is updated with new data inserted by the users. By deleting items in the inventory, the deleted items are no longer available on the system. CRUD functions are used in the interfaces aforementioned above.

Hash-tagging Module

Hash-tagging Module is adopted from social media features. It is actually separate module from My Inventory Module. These two modules are combined as to ease the interaction of users and the system. Hash-tagging allow users to categorise product based on hash-tag instead of commonly used categorisation. Hash-tag field can be located in the Add Product field in My Inventory Module (refer to Figure 3.13). Figure 3.16 shows hash-tag field of Add Product form.

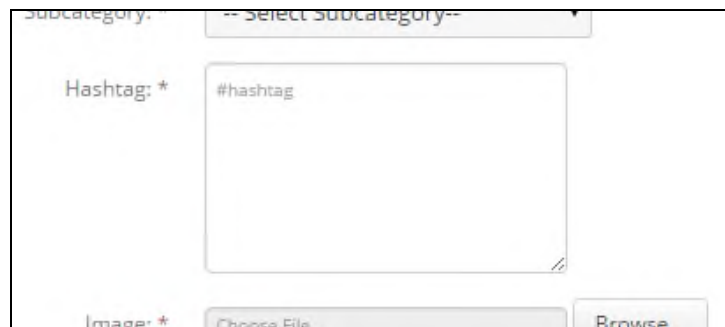
A screenshot of a web application form. At the top, there is a dropdown menu labeled 'Subcategory:' with the text '-- Select Subcategory--'. Below it is a text input field labeled 'Hashtag: *' containing the text '#hashtag'. At the bottom, there is a file upload section labeled 'Image: *' with a 'Choose File' button and a 'Browse...' button.

Figure 3.16 - Hash-tag Field

The hash-tag field is where the users put custom tag to their product. Any text or string input by users after the character “#” is fetch by the system and defined as a tag. Multiple hash-tag can be input by the user whether on the same line on separate line. Figure 3.17 shows the example of hash-tag input by user.

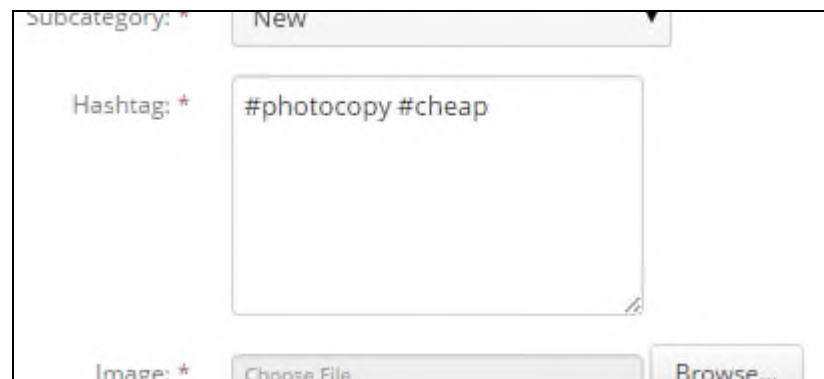
A screenshot of the same web application form as in Figure 3.16. The 'Subcategory:' dropdown is now set to 'New'. The 'Hashtag: *' text input field contains the text '#photocopy #cheap'. The 'Image: *' section with 'Choose File' and 'Browse...' buttons is visible at the bottom.

Figure 3.17 - Hash-tag (adding hash-tag)

Each hash-tag is defined as separate tag. In this case the tags are; photocopy and cheap. Figure 3.18 shows how the hash-tag is displayed on the web application.

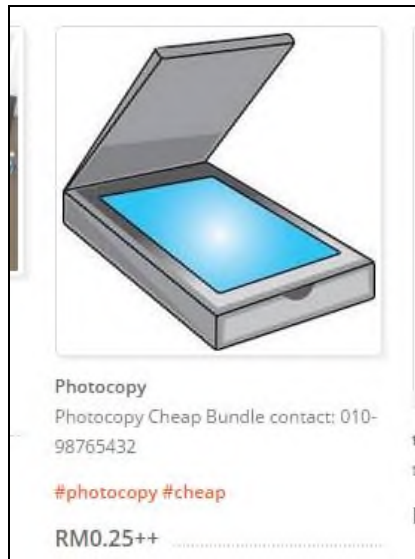


Figure 3.18 - Hash-tag (item display with added hash-tag)

Any hash-tag defined is clickable and one clicked by users, similar items with the same hash-tag are displayed to the users. Figure 3.19 shows items displayed once user clicked the hash-tag. Only similar items with the same hash-tag are displayed on the page.



Figure 3.19 - Hash-tag (item listing with the same tag)

Figure 3.20 shows code snippet of gethashtag() function. This code reads any string input from Hast-tag Fields and process the string pretext by “#” sign and separated by space as tags. The tags stored in the database are the one that act as identifier to filter item list by hash-tag.

<p>RETURNING CUSTOMER</p> <p>Your Username: *</p> <input type="text" value="username"/> <p>Your Password: *</p> <input type="password" value="*****"/> <p style="text-align: center;"><input type="button" value="Login"/></p>	<p>CATEGORIES</p> <ul style="list-style-type: none"> ▶ Login or Register ▶ Forget my Password
---	--

Figure 3.22 - Login Interface

Figure 3.23 shows the code snippet of the login module. This code reads the input from user and compares it with database. The user is successfully logged in if data existed in the database. Error message is displayed accordingly if data does not exist in the database.

```
function login(){
    if (empty($_POST) === false) {
        // username and password sent from form
        $myusername=$_POST['username'];
        $mypassword=$_POST['password'];
        $myusername = sanitize($myusername);
        $mypassword = sanitize($mypassword);
        $errors = array();
        if (empty($myusername) === true || empty($mypassword) === true) {
            $errors[] = 'Empty Username or Password';
        }
        else if (user_exists($myusername) === false) {
            $errors[] = 'Username not found';
        }
        else if (user_active($myusername) === false) {
            $errors[] = 'Account not activated';
        }
        else {
            if (strlen($mypassword) > 32) {
                $errors[] = 'Password too long';
            }
            $login = user_login($myusername, $mypassword);
            if ($login === false) {
                $errors[] = 'Wrong Password';
            }
            else {
                $_SESSION['username']=$myusername;
                header("location:index_2.php");
                exit();
            }
        }
        Print_r($errors);
        login_failed($errors);
    }
}
```

Figure 3.23 - Code Snippet (Login)

Search Module

Search module on the web application allows users to display item based on search query and the results are filtered according the keyword input by the user in the Search field. Figure 3.24 shows the interface of search module of the web application. The search field is where the user input keyword and search result are the displayed by the web application.

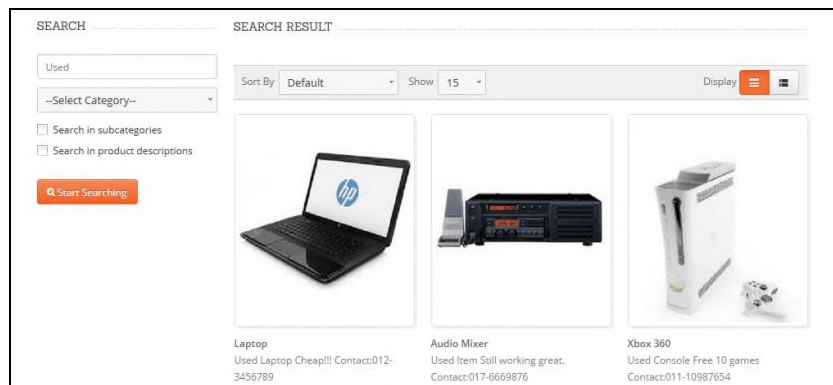


Figure 3.24 - Search Module Interface (success)

As shown in the figure, search results displayed the item with the keyword input by the users. If the search is unsuccessful, proper error message is displayed on the page. Figure 3.25 shows the unsuccessful search query.

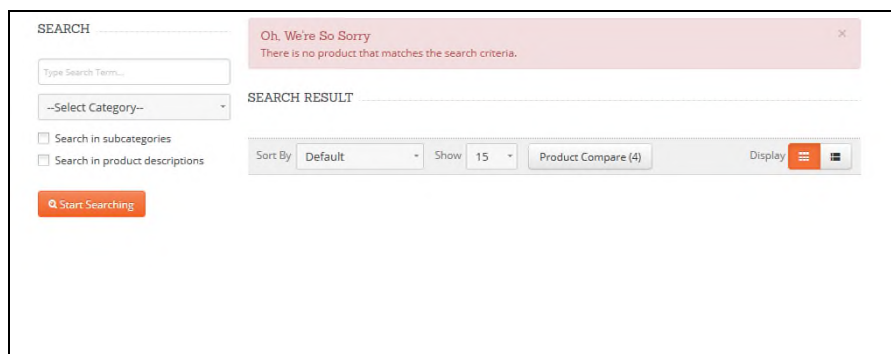


Figure 3.25 - Search Module Interface (failed)

Figure 3.26 shows the code snippet of the search module. The code fetches keyword input by users then compares with data in the database. If the keyword matches the data in the database, the search is successful, vice versa.

```

<?php
    $query = $_GET['query'];
    // gets value sent over search form
    $min_length = 3;
    // you can set minimum length of the query if you want
    if(strlen($query) >= $min_length){ // if query length is more or equal minimum
length then
        $query = htmlspecialchars($query);
        // changes characters used in html to their equivalents, for example: < to
&gt;
        $query = mysql_real_escape_string($query);
        // makes sure nobody uses SQL injection
        $raw_results = mysql_query("SELECT * FROM products
WHERE (`product_name` LIKE '%" . $query . "%')") or die(mysql_error());
        if(mysql_num_rows($raw_results) > 0){ // if one or more rows are returned do
following
            while($results = mysql_fetch_array($raw_results)){
                // $results = mysql_fetch_array($raw_results) puts data from database
into array, while it's valid it does the loop
                echo "<p><h3>". $results['title'] . "</h3>". $results['text'] . "</p>";
                // posts results gotten from database(title and text) you can also
show id ($results['id'])
            }
        }
        else{ // if there is no matching rows do following
            echo "Oh, We're So Sorry\nThere is no product that matches the search
criteria.";
        }
    }
    else{ // if query length is less than minimum
        echo "Minimum length is " . $min_length;
    }
}
?>

```

Figure 3.26 - Code Snippet (Search Module)

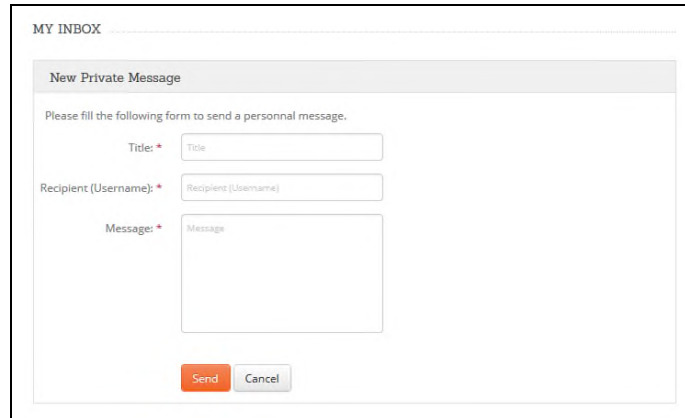
Private Message Module

Private Message is another social media features implemented into the web application. Private Message allows registered user to socialize in the web application. Only registered users can send private message between each other. Figure 3.27 shows the private message inbox panel. This is the page where all received messages are stored and displayed.



Figure 3.27 - Private Message Inbox Interface

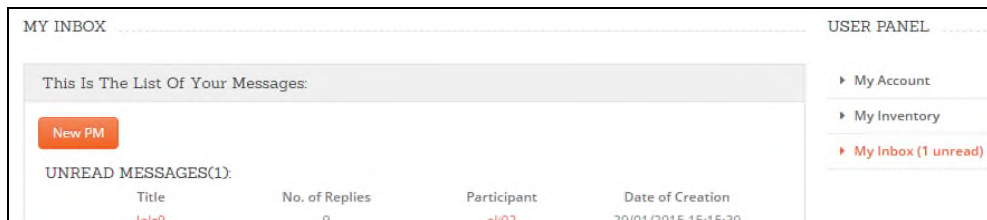
To send a private message, users need to click the “New PM” button to create a new message. Figure 3.28 shows the “create new message” interface. Users need to specify the title of the message. The recipient must be a registered user or there will be errors. The message field is where the main message body is input. Once done filling the field, the “Send” button will send the message to the recipient.



The screenshot shows a web interface for sending a private message. At the top, it says "MY INBOX". Below that is a section titled "New Private Message" with the instruction "Please fill the following form to send a personal message." The form contains three input fields: "Title:" with a text box, "Recipient (Username):" with a text box, and "Message:" with a larger text area. At the bottom of the form are two buttons: "Send" (in orange) and "Cancel" (in grey).

Figure 3.28 - New PM

Figure 3.29 shows the recipient’s private message interface inbox notification. Whenever new message received, users will be notified of new unread message. Unread message can be viewed in private message inbox interface.



The screenshot shows a web interface for a private message inbox. At the top, it says "MY INBOX" on the left and "USER PANEL" on the right. Below "MY INBOX" is a section titled "This Is The List Of Your Messages:" containing a "New PM" button. Below that is a section titled "UNREAD MESSAGES(1):" with a table. The table has four columns: "Title", "No. of Replies", "Participant", and "Date of Creation". The first row shows a message with a red "1" in the "No. of Replies" column. To the right, under "USER PANEL", there are three menu items: "My Account", "My Inventory", and "My Inbox (1 unread)" which is highlighted in red.

Title	No. of Replies	Participant	Date of Creation
July 9	1	aj02	20/01/2015 15:15:30

Figure 3.29 - Inbox Notification

Figure 3.30 shows the code snippet for the private message inbox. The retrieve the message received stored in the database. Two queries are executed; one for new message whiles the other for read message.

```
//We list his messages in a table
//Two queries are executes, one for the unread messages and another for read messages

$req1 = mysql_query('select m1.id, m1.title, m1.timestamp, count(m2.id) as reps,
user.user_id as userid, user.user_name from pm as m1, pm as m2, user where
((m1.user1="'.$_SESSION['user_id'].'" and m1.user1read="no" and
user.user_id=m1.user2) or (m1.user2="'.$_SESSION['user_id'].'" and m1.user2read="no"
and user.user_id=m1.user1)) and m1.id2="1" and m2.id=m1.id group by m1.id order by
m1.id desc');

$req2 = mysql_query('select m1.id, m1.title, m1.timestamp, count(m2.id) as reps,
user.user_id as userid, user.user_name from pm as m1, pm as m2, user where
((m1.user1="'.$_SESSION['user id'].'" and m1.user1read="yes" and
user.user_id=m1.user2) or (m1.user2="'.$_SESSION['user_id'].'" and m1.user2read="yes"
and user.user_id=m1.user1)) and m1.id2="1" and m2.id=m1.id group by m1.id order by
m1.id desc');
```

Figure 3.30 - Code Snippet (inbox)

Figure 3.31 shows the code snippet of sending new message. The successful message is displayed when the message is sent. If unsuccessful, error message will be displayed.

```
$id = $dn1['npm']+1;
//We send the message
if(mysql_query('insert into pm (id, id2, title, user1, user2, message, timestamp,
user1read, user2read)values("'.$id.'", "1", "'.$title.'", "'.$_SESSION['user_id'].'",
"'.$dn1['recipid'].'", "'.$message.'", "'.$time().'", "yes", "no")) {
<h3>My Inbox</h3>
<p>The message has successfully been sent.</a>
<?php header("refresh:3:url=list_pm.php") ?>
$form = false;
} else {
//Otherwise, we say that an error occurred
$error = 'An error occurred while sending the message';
}
```

Figure 3.31 - Send New Message

CHAPTER 4

ANALYSIS AND RESULTS

This chapter lists and describes the analyses done throughout this project. The Functionality Test is performed on deployment of the web application. The user acceptance test (UAT) takes place after deployment phase of Entre-Hub. The results are tabulated and analysed.

4.1 Functionality Test

During application testing, a test case is a well-arranged series of inputs with circumstances and variables that determine whether a piece of module is functioning properly. For functionality testing, test cases are used to test the application's interface and determine how an application and the user interact. For project functional testing, the test case would be the module of the application. For Entre-Hub, main modules tested are Private Messaging Module, Hash-tagging Module, and Search Module. Pilot testing method is used when conducting the functionality test. In which case, the evaluator is under the developer's supervision during the whole testing phase. The evaluators are volunteers involved in beta-testing phase earlier during the development of the system. A maximum of 10 test-runs are performed on each module. Table 4.1 shows the test results.

Table 4.1 - Functionality Test Results

Modules	Results (PASS:FAIL)
Private Messaging Module: <ul style="list-style-type: none">• Send message.• Receive message.• New message notification.	10:0 10:0 9:1
Hash-tagging Module: <ul style="list-style-type: none">• Create hash-tag.• Hash-tag functionality.• Modify hash-tag.	9:1 10:0 10:0
Search Module <ul style="list-style-type: none">• Keyword search.• Results relevance.• Multiword search.	9:1 7:3 6:4

For Private Messaging Module, the main components which are Send Message, Receive Message, and New Message Notification are tested. The first two main components passed all ten of the test runs while new message notification failed one of the tests.

For Hash-tagging Module, the main components which are Create Hash-tag, Hash-tag Functionality, and Modify Hash-tag are tested. The create hash-tag components passed nine test runs but failed one. While the remaining two components passed all ten test runs.

For Search Module, the main components tested are Keyword Search, Results Relevance, and Multiword Search. Keyword search failed one test runs while passed the other nine. Results relevance on the other hand passed seven test runs but failed three of them. Multiword search unfortunately failed four of the test runs and only passed six of them.

Based on the results tabulated, not all the components passed all the test runs. Even though the result appeared to imperfect, on the other hand, the ratio of Pass-to-Fail is still on the acceptable level. Therefore the web application is then proceeded to be hosted and deployed on the net.

4.2 User Acceptance Test (UAT)

After the deployment of Entre-Hub on the net, user acceptance test (UAT) is conducted along the deployment of the system. The UAT conducted are to evaluate users' acceptance of the system. Respondents are volunteers gathered from UiTM Jasin. 20 respondents are to fill Google document form for UAT test. Table 4.2 shows the sample UAT form filled by the respondents. Figure 4.1 shows the results obtained from the UAT.

Table 4.2 - Sample UAT Questions

Functionality	Agree	Disagree
Search Module is functioning properly.		
Login functions properly.		
Private Messaging is Functioning Properly.		
Add Inventory functions properly.		
Update Inventory functions properly.		
Delete Inventory function properly.		
Hash-tagging functions properly.		
The System functions as intended.		
Search Module is helpful.		
Private Messaging is helpful.		
Hash-tagging is helpful.		
The System is helpful.		

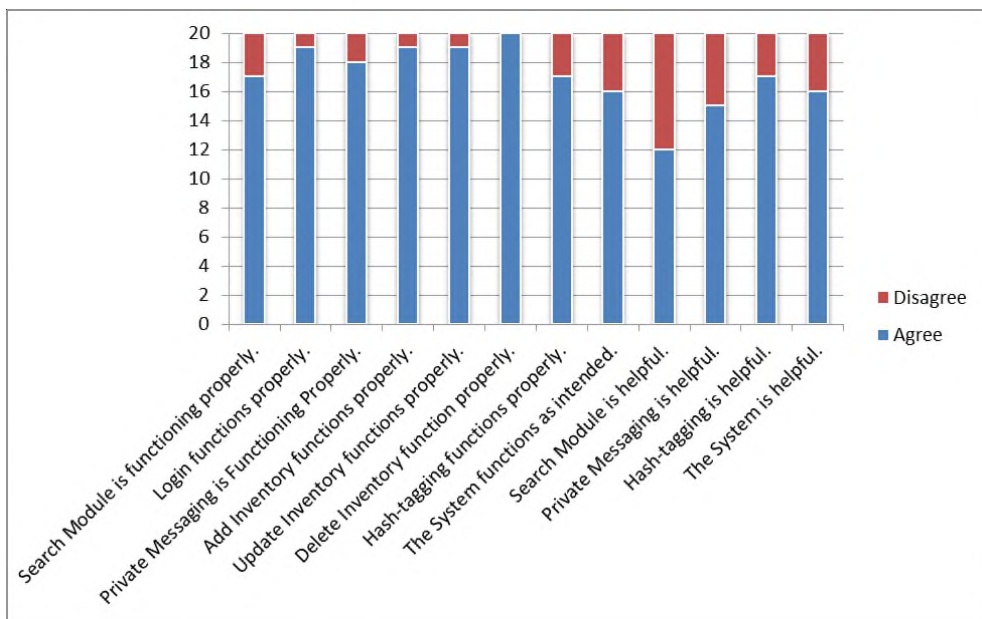


Figure 4.1 - UAT Results

From the results obtained, out of 20, 17 respondents agree the Search Module is functioning properly but only 12 find it helpful. For Login module, 19 respondents agree it functions properly. A number of 18 respondents agree that Private Messaging functions properly and 15 respondents find it helpful. For the case of Inventory module, Add, Update, and Delete; 19, 19, and 20 respondents respectively agree it functions properly. Regarding Hash-tagging module, 17 respondents agree that it functions properly and 17 respondents find it helpful. As a whole web application, a number of 16 respondents agree the system functions as it is intended and also 16 respondents find it helpful.

Based on the UAT results, majority of the respondents are in favour that the system functions properly and also find it helpful. It is proven that users are in favour of the usefulness of Entre-Hub as seen in the UAT. Thus, Entre-Hub is hosted and live on the net.

CHAPTER 5

CONCLUSION

The detailed functionality of the system has been presented in this report. Entre-Hub allows users in UiTM Jasin, students and staffs, do trade and business online. Researches are done and features implemented in Entre-Hub proven to accommodate the needs of users in UiTM Jasin. The aim and the objectives of the whole project have been achieved and the system is deployed on the net. The system complemented the user requirements based on the information gathered during the development phase. The functionality test results of the system are satisfactory and the system functions as it is intended to be. The UAT conducted is also resulted in getting positive response from users.

As of current stage of development, the limitation of the system is that it lacks security. Due to this situation, the implementation of payment gateway is not considered wise. Aside from that, the system is also currently only available for UiTM Jasin. Improvement of the system, particularly the security of the system is highly recommended. By improving the security, the system can be further enhanced by implementing payment gateway. As an addition, expanding the availability of the system throughout all UiTM branches is also recommended.

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