Faculty of Cognitive Sciences and Human Development

DESIGN AND DEVELOPMENT OF AN ONLINE DATABASE SYSTEM FOR INVENTORY STOCK MANAGEMENT

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Bachelor of Science with Honours (Cognitive Science)
2021

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DESIGN AND DEVELOPMENT OF AN ONLINE DATABASE SYSTEM FOR
INVENTORY STOCK MANAGEMENT

MC BRYAN AMALIA

This project is submitted
in partial fulfilment of the requirement for a
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The project entitled 'DESIGN AND DEVELOPMENT OF AN ONLINE DATABASE SYSTEM FOR INVENTORY STOCK MANAGEMENT' was prepared by Mc Bryan Amalia and submitted to the Faculty of Cognitive Sciences and Human Development in partial fulfilment of the requirements for a Bachelor of Science with Honours (Cognitive Science).

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ABSTRACT

Inventory management is an important aspect where it is a system to control its stocks or product. This aspect will determine the flow of the business profit or loss within a company. The objective of this project is to investigate and select appropriate programming software for the development, design, and develop the system and assess the level of satisfaction of the system. This project uses the Hypertext Markup Language (HTML), Hypertext Pre-processor or Personal Home Pages (PHP), Structured Query Language (MySQL), and Visual Studio Code software as the programming language and development platform of the system. The method being implemented into this project is the Agile Development method containing planning, design, development, testing, and evaluation. This project's function is to ease shopkeepers and also their customer. It works by updating their products stock into the system rather than manually update by using paper and pen. Customers can shop items from their homes by using this system's ordering feature. Then the evaluation being deployed is using the usability evaluation to few selected respondents. The results highlight that all of the evaluators are satisfied and can use the system easily and our evaluation shows that the function works according to the planned features. In the conclusion, the design and development of an online database system for inventory stock management were successfully developed and can be used by users to ease their daily work and activities. The three objectives in this project were met.

Keywords: inventory management, online database, web-based, system development

ABSTRAK

Pengurusan inventori adalah aspek penting di mana ia adalah sistem untuk mengawal stok atau produknya. Aspek ini akan menentukan aliran keuntungan atau kerugian perniagaan dalam sebuah syarikat. Objektif projek ini adalah untuk menyiasat dan memilih perisian pengaturcaraan yang sesuai untuk pembangunan, reka bentuk, dan pengembangan sistem dan menilai tahap kepuasan sistem. Projek ini menggunakan Hypertext Markup Language (HTML), Hypertext Pre-processor atau Personal Home Pages (PHP), Structured Query Language (MySQL), dan perisian Visual Studio Code sebagai bahasa pengaturcaraan dan platform pengembangan sistem. Kaedah yang dilaksanakan dalam projek ini adalah kaedah Agile Development yang mengandungi perancangan, reka bentuk, pengembangan, pengujian, dan penilaian. Fungsi projek ini adalah untuk memudahkan pekerja kedai dan juga pelanggan mereka. Ia berfungsi dengan mengemas kini stok produk mereka ke dalam sistem daripada mengemas kini secara manual dengan menggunakan kertas dan pen. Pelanggan boleh membeli barang dari rumah mereka dengan menggunakan kemudahan pesanan sistem ini. Kemudian penilaian yang dilakukan adalah menggunakan penilaian kebolehgunaan kepada beberapa responden terpilih. Hasilnya menunjukkan bahawa semua penilai berpuas hati dan dapat menggunakan sistem dengan mudah dan penilaian kami menunjukkan bahawa fungsi berfungsi mengikut ciri yang dirancang. Kesimpulannya, reka bentuk dan pengembangan sistem pangkalan data dalam talian untuk pengurusan stok inventori berjaya dikembangkan dan dapat digunakan oleh pengguna untuk memudahkan kerja dan aktiviti harian mereka. Tiga objektif dalam projek ini tercapai.

Kata kunci: pengurusan inventori, pangkalan data dalam talian, berasaskan web, pembangunan sistem

CHAPTER ONE

INTRODUCTION

1.1 Background of study

Technology is making our lives more convenient nowadays. It enhances the communication methods, modified the presence of agility, and it had a huge effect on the growing of our lives in this developing world. The transformation of internet websites has made the people being interested in the newest technology and they tend to get all of the information within their control and easily.

Stock inventory or stock management is one of most recognizable and important aspect for many small business owners (Ullrich, 2019). Components, products in a form of raw material and finished items are all unique types of inventory. Then every specific item created is known as money tied up as purchased products until the stock or inventory leaves the warehouse or shop. At the same time, inventory stocks in a retail store only contribute to profits when their sale places money in the checkout counter.

In this project, an online database specifically created for inventory stock management will be developed. Primarily it handles the updating of the current stock or item in the grocery store. This system helps to keep track of its store's current stock level. Stock availability is very essential in every type of business, the like of food business, workshop business and so on, where they need to keep aware of their raw material so that the stock does not run out. When the owner always looks through its stock, they will notice if some of its stock need to be added to avoid the business being stalling. This system also provides an interface for the customer to look through the available stock in the shop and also can order the desired item in that shop. Whereby during the COVID-19 pandemic, the online shopping is now getting increasingly popular. Shopping for basic needs such as food, toiletries and so on where you

go out from your residence to go to a mall or grocery store which it can increase the risk of getting expose to the virus mention earlier.

As stated by Berezhnoi (2019), a web-based system interface plays a key role to obtain the attention of the visitors of the website. Besides that, improving the user-friendly technology will bring impact to visitor's experience.

The project with the following features will be proposed:

- Assisting in grocery store work. The system provides an interface for work such as updating inventory stocks from time to time, and

- Interactive ordering system of the shop's product. Customer can look through the list of items from the shop's ordering system.

This project is expected to encourage business owner to use current information technology facilities. This facility is to facilitate the work of retail workers and to reduce the risk of problems being occurred. Synchronously with the new norm during this COVID-19 pandemic, where people were instructed to reduce movement outside home and to buy things through online.

1.2 Problem statement

Most grocery store operators use paper and pen to record information related to the stock available in their stores. By using that method, it takes a lot of time and energy to focus just to do the recording process of the stock. For example, a shopkeeper needs to write the entire stock information into an inventory stock form. This task has spent most of its working time. Moreover, the shopkeeper also needs to look all that papers to confirm or verify the data that has been written to avoid data error.

Manual inventory stock update can also cause another problem too. There are high risk loss of important documents or information related to the inventory stock. Applying this

kind of way of organizing the stock data is less effective nor efficient. It less effective because manually update may or will make the data less accurate for future information.

Nowadays, shopping activities or any activities that relate to a congested place, the person is at high risk of getting expose to the current COVID-19 virus. This case will cause problem where customer not able to shop item as usual as before. In order to lower the risk of getting expose, people are now being recommended to shop through online. As most people known, not every place or district where the mall or shop provide online shopping for their customer. This project proposes, every shop owner able to use the system where they can update stock of their shop and provide simple ordering system. Where the shop can deliver it by 'cash on delivery' (COD) or the customer can drive thru pickup at the shop for the customer purchased item.

List of problem statement:

Comparison between traditional way and system way

- Require a lot of time manually update the stock
- The risk loss of important documents or information related to the inventory stock because of manual update of stock

Challenge of system development

- Confusion or difficulties faced while developing a web-based system

Comparison between consumer and system

- Congestion at the grocery store while buying can cost lots of time and energy spent

Figure 1 shows an example of stock inventory form that similarly used by common shop out there. It was used for manually update of the incoming or outcoming stock in the store. This form is very crucial to be keep by the staffs in order to keep track of the stock in their shop. So, there problem is whenever the form missing or destroyed, then it will become a big problem to the shop owner and the staff whether their shop getting a profit or a loss.

Figure 1: Example of stock inventory form used to record stocks data

1.3 Project Objective

The objective of this project as indicated below:

- To investigate and select appropriate programming software for the development of the proposed system;

- To design and develop the online database system for inventory stock management; and

- To implement and assessing the level of satisfaction of the developed system.

1.4 Scope of study

The scope of the study about this project is to provide a solution to the problem statement above. This project development is fully focus on small businesses owner such as grocery stores. So that the store owner is able to use the system to constantly update the stock and for the customers, they are able to use the system to make a purchase online. This system should be capable of collecting, updating and monitoring data from employer or staffs involve. Other than that, it is also a systematic method of data recovery that focuses on enhancing the recording, storing, update and maintenance process of data in the database.

CHAPTER TWO

LITERATURE REVIEW

2.2 Inventory Stock Management

Based on ("stock – definition of stock in English from the Oxford dictionary," n.d.) a stock is A stock source that is available for purchase in a store. Then according to ("inventory – definition of inventory in English from the Oxford dictionary," n.d.) is a written list of all the objects, furniture, etc. in a particular building. Which bring mean a list of different items that being store in some place or warehouse.

Then for ("stock/inventory management – Wikipedia, the free encyclopedia," n.d.) also explain that stock management is the role of knowing a company's inventory mix and the various demands on that stock. Both external and internal factors affect the specifications and are balanced by the production of purchasing order requests to maintain supplies at a fair or specified amount. For any other business enterprise, stock management is essential.

According to the book by Toomey (2000) entitled Inventory Management: Principles, Concepts and Techniques, the Inventory Management is as the specific business management component with inventory control and preparation. Inventory Management's function is to maintain the desired amount of stock of particular goods or objects. So, in every business sector, the inventory stock management is one of the crucial parts to make sure their stock is always available to make sure the business goes well.

2.3 Web-Based system

As stated by Kambala (2018), a program which is accessed using HTTP is basically a web-based system. Typically, the phrase web-based is used to define programs that running on a web browser. This, however, also can be used to define applications loaded on the client

PC that have a very limited component of the solution. A local server could be the host server for a web-based system, or it could be accessed over the internet.

Based on research by Duan, Edwards & Xu (2005), they stated that during this evolvement of information technology, the discovery of an easiest method of retrieving information worldwide by using the web-based system, where it can be obtained by users just by going through or based on someone's fingertips. Where they can just use their gadget such as smartphone or laptop to retrieve information worldwide.

On the other hand, based on the journal entitled Understanding Web-based learning continuance intention: The role of subjective task value by Chiu & Wang (2008), mentioned that an effective web-based information application relies on the willingness of the user to use the system after trying the system. Some researchers stated that end user is looking for performance and expectation of effort, machine self-efficacy and value of attainment that support the intentions of a person to continue using the web-based system.

2.3.1 Benefit Web-Based

Web-based information system can improve work efficiency in stock keeping unit and can helps businessman and staff facilitate their work. A research by Worwa & Stanik (n.d), there are few benefits of web-based system as list below:

- Reliability

  Testing, ensuring, guaranteeing, and assessing software reliability has been dedicated based on comprehensive research literature and a wide range of resources. Highly reliable software is needed for safety-critical software applications such as telecommunications, aerospace, and medical devices. For this project case, it will be needed to develop an inventory stock management system that is reliable, which is why the author use this web-based system.

- Usability

  Web-based system users have evolved to expect that by using this platform it must be easy to interact with. So, basically usability in web-based is very simple and clear that any user can interact.

- Security

  Almost all web-based systems have dedicated servers that can supervise massive amounts of users simultaneously and are monitored and maintained by professional server administrators. Every web-based system needs a high-level security system to protect the data from being hack by irresponsible parties.

- Availability

  A web-based system will always be able to access anywhere, anytime if there is a gadget with an access of internet connection. This benefit can bring flexibility for the users to control over accessing of the web-based system.

- Maintainability

  A web-based system can be easily controlled by downloading or updating a new version of the program that is installed on a server computer. It can be accessed and used by all users instantly.

2.4 Online Grocery Shopping due to Covid-19

According to Banoo (2020), the beginning and actively spread of the virus of Covid-19, then 'Movement Control Order' (MCO) were announced by the government led to a rise in orders of various type of item such as food, cloth, and everyday needed item. Where new customers and active consumers for online delivery services by a certain sector that sells handpicked products from supermarkets and specialty stores.

Online grocery shopping is not something new, where it has been done for the past 5 years but due to this Covid-19 pandemic, the potential of growing online grocery shopping

will be happening. Online grocery shopping has been done by the community based on the central city for example in Sabah, Malaysia, where Kota Kinabalu and Sandakan provinces are the only places that offers this online shopping services. But for a small place or district where the market did not offer this online grocery shopping services will disrupt the potential growth of such online grocery.

2.5 Borneo Kaki Online Supermarket

Borneo Kaki Online Supermarket is the example of the online grocery shop that frequently used by the population in the city of Kota Kinabalu, Sabah. With this kind of system, the customer can easily place order and the delivery will be done by the company or drive-thru to the shop to take and go for their ordered item. If there is a system or service similar like this being offer all around the place wherever district you live, then the potential or growth for the grocery shopping will be increase as stated in the article written by Banoo (2020).

Figure 2 shows the example of the ordering system. It shows that the interface provides 'sign up' and 'login' feature for the user to register and login to start ordering product from the system. Figure 2 also shows the list of product category and navigation bar for user to explore on. In figure 3, it's an example of dashboard or menu display for the product that available in the store. It will detail to the customers with images of product, prices and the product's stock availability.
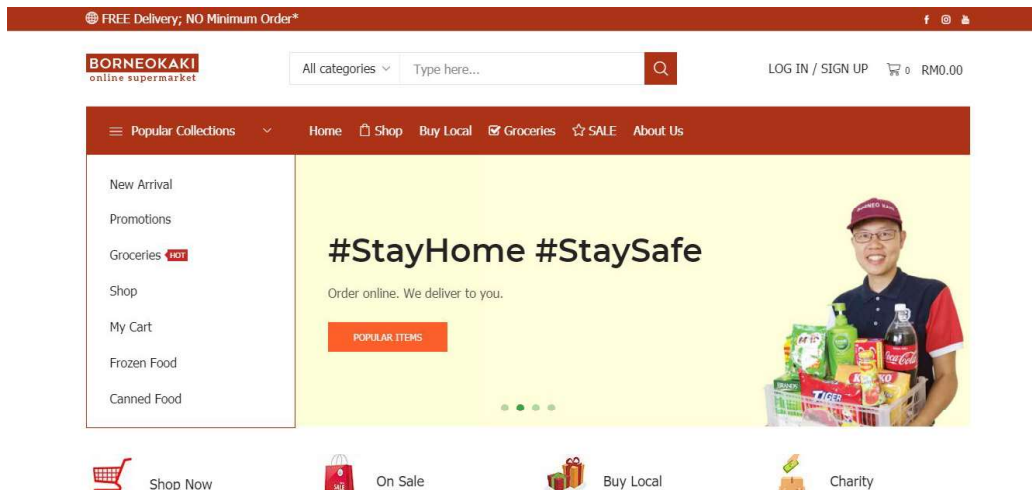
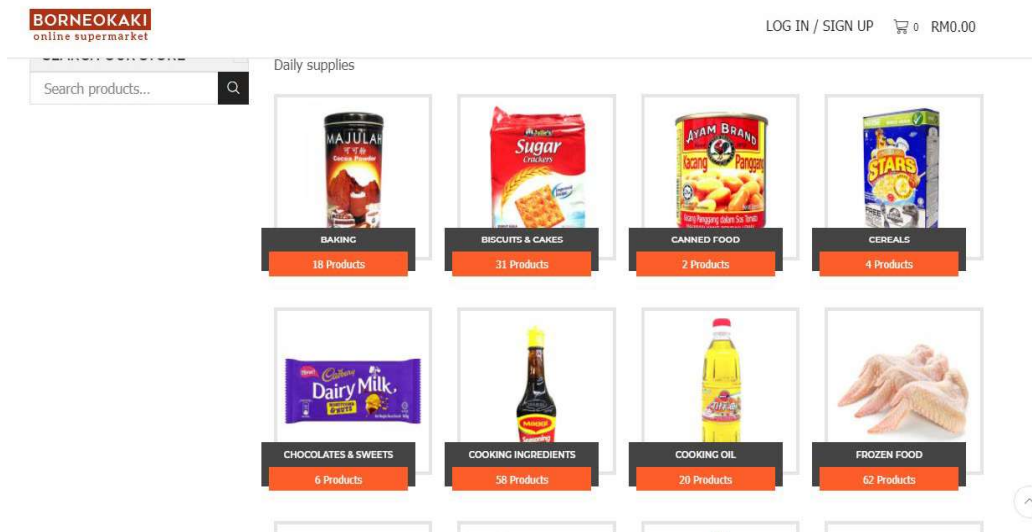*Figure 2*: The example of the home interface of BorneoKaki Online Supermarket

Figure 3: The section in the online supermarket where the system shows the Grocery interface

2.6 Shopee Online Shopping Platform

Forrest Li who created Shopee which is a Singapore-based E-Commerce platform in 2009 as part of Sea Group before that it was previously known as Garena (Lee, 2017). According to Econsultancy website, (https://econsultancy.com/reports/shopee-localizing-ecommerce-in-southeast-asia-and-taiwan/), the first buyer was introduced in Singapore, and since then, it has extended to Malaysia, Thailand, Taiwan, Indonesia, Vietnam, and the

Philippines. It enables Southeast Asian and Taiwanese customers to purchase and sell items online.

Shopee provide a safe and easy shopping activity to its users where the platform counters the problem when buying and selling product face-to-face in marketplace and it's becoming more complicated nowadays as stated by Ting (2015).

Figure 4 shows the well design of Shopee platform that attract many of its users because of their well-developed web-based system. Shopee allows its users to buy lots of product and thousands of sellers to display their item in the system. This system also provides lots of other feature for example like effectively using promotional tools to attract customer, warehouse and order fulfilment right to protect customer order and many more.
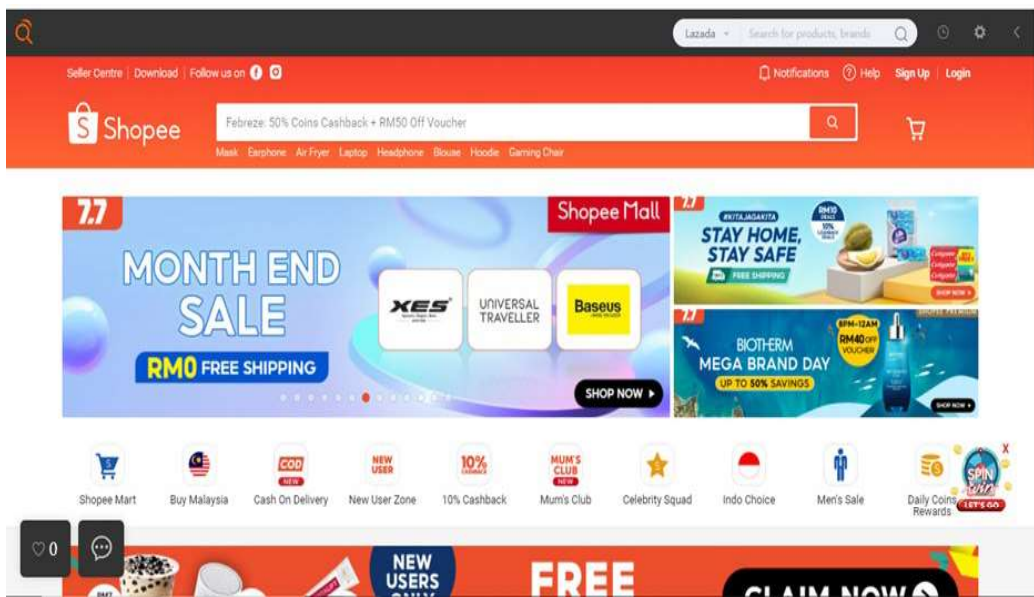

Figure 4: Display of the Shopee shopping platform

2.7 Designing Effective Online System

According to Nazareth (1998) to develop a high usability website, it applicate a macro-level design. Where the micro-level design problems are largely affected by evolving technology and are continuously subject to regular revision and updating.

Figure 5 illustrate the implication of construction, validation and the maintenance of the web-based system based on the 3 aspect that being highlighted which is the user perspective, task perspective and technology perspective.
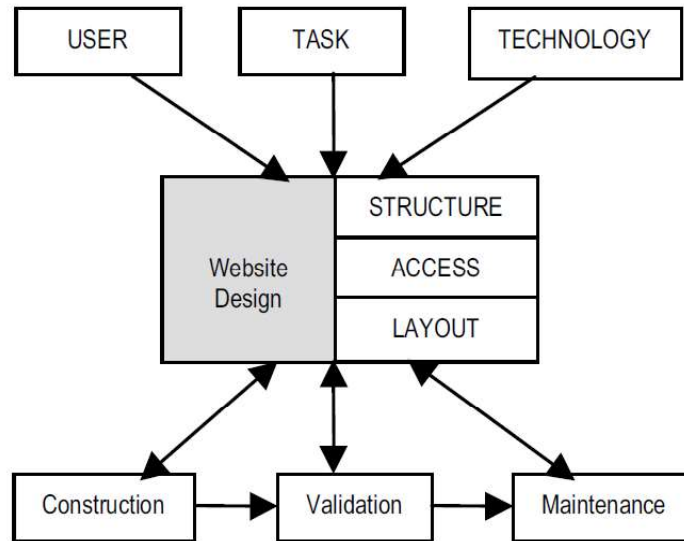

Figure 5: The consideration that need to be taken when designing a website

Based on previous research by Bannon (1986), the designing of a website should be centre based on the user, the task, and the technology available.

- User Considerations

  A good website will well-define and identify their audience which known as the user of the system (Nazareth, 1998). Every website or web-based system, before it being develop, they will identify their users to know exactly how designing and developing process going on. For example, if the website is all about marketing or commercial, they will target any potential customer as their visitor of its website and the same if the website is about educational, where student is their target visitor for that particular website. So, in designing an effective website or web-based system, identifying our target user is important.

- Task Considerations