Building Intelligent Web-Based Customer Service

by

Kyairiyatul Aini binti Abdul Wahab

Dissertation submitted in partial fulfillment of
the requirements for the
Bachelor of Technology (Hons)
(Information Technology)

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University Teknologi PETRONAS
Bandar Seri Iskandar
31750 Tronoh
Perak Darul Ridzuan

CERTIFICATION OF APPROVAL

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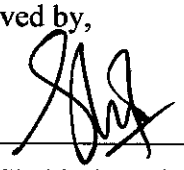
Approved by,



(Miss Shakirah Mohd Taib)

UNIVERSITI TEKNOLOGI PETRONAS
TRONOH, PERAK
July 2005

CERTIFICATION OF ORIGINALITY

This is to certify that I am responsible for the work submitted in this project, that the original work is my own except as specified in the references and acknowledgements, and that the original work contained herein have not been undertaken or done by unspecified sources or persons

KYAIRIYATUL AINI BT. ABDUL WAHAB

ABSTRACT

Rapid growth in business world nowadays has increased the competition among those companies and also makes it more challenging. Companies need to give the best service in order to attract those customers. One of the important strategies to create good customer relationship is by having best customer service. Nowadays, customers can interact within the company via several communication ways. Those communication ways are phone, email, live chat, search and also FAQ.

This report describes a research about building the intelligent Web based customer services which provide an interactive experience that can increase customer interaction. The research is involving the artificial intelligent techniques into e-business. The focus is to develop an agent by applying chatting concept between the agent (system) and customer. The agent is an independent system that performs as customer service in e-business. The agent will make the customers feel like they are dealing with real human.

The research will further into e-business, artificial intelligent and rule based knowledge scope. This research involves online questionnaires to elicit the needed knowledge. Questionnaires are involved in this research to get feedback from the customer about their opinion regarding the current system. Present research has developed the intelligent Web-based customer service, which its goal is giving efficient service and satisfaction to the customers.

Keywords: e-business, artificial intelligent

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ABBREVIATIONS AND NOMENCLATURES

AI	Artificial Intelligent
E-business	Electronic Business
E-mail	Electronic Mail
FAQ	Frequently Ask Question
HTML	Hypertext Markup Language
IA	Intelligent Agent
IT	Information Technology
MMS	Multimedia Messaging Service
NL	Natural language
PID	Project Initiation Document
CSS	Cascading Style Sheet
WAN	World Area Network
UAT	User Acceptance Testing
UTP	Universiti Teknologi Petronas

CHAPTER 1

INTRODUCTION

1.0 INTRODUCTION

1.1 Background of Study

In globalize and fast shrinking world, business today is facing with lots of opportunities as well as challenges. Due to globalization and advances in technologies, most of companies tend to get involved into e-business. The transition from business to e-business increase the profit of the companies as the shopping and purchasing is been done online. Besides, by having business through Internet can expand the promotion of the product widely around the world. The shopping and purchasing process can be done twenty-four hours per week. Since the e-business market keeps growing, it is important for the companies to attract customers by providing the best performance and services. One of the strategies to attract the customer is by having good customer service or support. If the good customer relationship already been established, customer will tend to give their loyalty since they have satisfied with the service from the company. There are lots of customer service tools such as FAQs, phone, e-mail and live chat. Now, the focus is more into Web based kind of customer service since it is dealing within e-business environment.

The concept of Web based customer service as an integral part of the business strategy promises great potential in ensuring success. Internet based customer service adds another touch point to the whole customer relationship process. Web based customer service moves services and support function onto the Internet, away from high-cost environments where they are traditionally performed. As such, Web based customer service promises great expectation and potential, where service is fast, meaningful, compelling and

customer driven. Success could bring increased sales, more repeat business, greater brand awareness and stronger customer relationship. The Web has become an intensively interactive medium and it's a great place to support customer and establish great relationship with them. However, it is also a great place to loose customer too. A frustrated customer can break their loyalty just by one click on the mouse.

Customers are really important for the company as they are one of the aspects that will determine the income of the company. The increasing number of customers means the sales of company is also increased. There are many types of services that can be provided for the customers. The services that can be provided are such as supplying the information of company and products, providing customer supports and interaction and also supporting electronics transaction. By having business within Internet means that the company will be dealing with vast amount of information about the company, products and also other information. Therefore, the focus of the research is to develop Web based customer services that solve customer problems, providing the information and also as a virtual guide throughout the Web. Due to the rapid progress in the technology, artificial intelligent is a major evolution toward solving this problem. Artificial intelligent empower both buyers and sellers to accomplish e-business transaction by enabling efficient, precise, and comprehensive searches on the Web with a vast information repository.

Artificial intelligent is a field of computer science that seeks to understand and implement computer based technology that can simulate characteristics of human intelligence. The customer service that will be developed is also known as intelligent agent (IA). An intelligent agent is a knowledge based system that has capability of running without supervision and interacting with many databases, or system components over many networks to return the necessary results.

The history of IA started in the early 1950. During that time, English logician Alan Turing hypothesized the near-future existence and reinforcement of the dialectical relationship between man and machine. In 1966, the first software capable of conversing with a human had been build by Joseph Weizenbaum. The first software is called ELIZA [8].

The technology of this IA has growing rapidly and more variety. Artificial intelligent can be broken into several different disciplines. The different disciplines are expert systems, natural languages, simulation of human sensory capabilities, robotics and neural networks.

How is IA being useful in e-business? E-business is not only buying and selling things in internet but also servicing customers and collaborating with business partner [6]. By having good customer service is an advantage in e-business world, which as a strategy to increase customer loyalty. Nowadays, people tend to use IA to service the customer, which we known as intelligent Web based customer service. This IA includes customer information management and enterprise knowledge base management. The agent is very knowledgeable and informative in helping the customers.

1.2 Problem Statement

1.2.1 Problem Identification

Nowadays, most of the companies that involved in e-business are competing among each others in order to attract those customers to buy their products. As one of the strategy to attract the customer is by having good customer services. There are many ways in order to provide the customer support. As for this research is concerning into provide service in kind of information, problem solving and also virtual guide. By having the business online, it is dealing with lots of information to the customers.

Based on the previous research that has been done, customers tend to have a communicative and interactive kind of customer service. The customer service tools need four important points which are responsiveness, accuracy, consistency and also cost. The explanation of those points is as below.

Responsiveness is an important issue in handling customers. Responsiveness involves the issue of time. If customers have any problems or inquiries, they want to have the answer fast. The concept is 'I ask and you answer simultaneously'. Based on the survey that had been conducted by Harris Interactive about the customer service resulted that customers will give

their loyalty to the company that provides responsive customer service [20]. However, customer will give their loyalty with the responsive service and also satisfied them. This will lead to the accuracy and consistency point.

Accuracy and consistency are also important issues. Every questions that been asked by the customers must be answered correct and accurately. The term accurate here is considered as the answer is correct and also satisfied the customer. Sometimes, the answer given is accurate but customers don't understand the answer in technical aspect. The customer will tend to say that the answer is incorrect and this will lead to the bad impression to the company.

Cost is an important issue nowadays. People want to have something that in good quality but the cost is less. Cost factor is been considered for the both side which the company and customers. The company wants to provide the best customer service which has less in cost. The company needs to provide the best quality communication service tool which can benefit the both side. If the company provides good customer service but the cost is high, it is useless. If the customer needs to spend lots of money in order to have customer service, this is not a good strategy in handling business.

1.2.2 Significant of Project

Nowadays, businesses are racing to implement integrated e-business applications. These new applications bring together critical data from a range of business applications and present it to users in new, purpose-built ways. With the use of Internet technologies such as Web browsers, and the ability for external systems to interact directly over the Internet, e-business integration has become a critical force in modern information systems. New breeds of e-business software offer compelling business benefits, including substantial reductions in time-to-market, reduced development and deployment costs, and infrastructure adaptability and scalability.

This is significant to have the intelligent Web based customer service in e-business environment. This system eliminates the tradeoff between cost and effectiveness in customer support. It also combines the quality of human response with the control and availability

twenty-four hours per week of automated systems. Besides, it provides the consistency and accuracy in serving the customers since it is very informative and knowledgeable. This kind of technology is important for the next step of generation approach.

Companies that are currently implementing integrated e-business solutions enjoy a number of benefits that include being able to:

- Leverage and extend IT investments
- Reduce unnecessary administration costs
- Rapidly respond to competitive changes
- Strengthen relationships with customers, partners, and suppliers
- Shorten lead times and cycle times to deliver better customer service
- Speed time-to-market for new products and services

1.3 Objectives

The objectives of this research are as follows:

1. To apply the concept of intelligent agent in e-business

   Intelligent agent is a new technology or strategy in e-business environment. This project is to show to the world about intelligent agent servicing as customer service in e-business. Besides, it is also to emphasize the advantages and important by having intelligent agent as customer service, which we known as intelligent Web based customer service. In introducing intelligent Web based customer service, the important points in building the agent also will be identified.

2. To develop the Intelligent Web based System and implement it.

   Nowadays, most of company use FAQ, Search function, E-mail and other communication tools as the customer services. However, those communication tools been claimed as not

effective enough to service the customer and also to benefit the company. As technology advances, a new communication tools which will give benefits to both parties, the customer and company, is needed. This communication tool is servicing the customer as the customer will feel like they are dealing with real human. In order to develop this communication tool, any web programming language can be used, which the tool has lots of knowledge and information in order to service the customers.

1.4 Scope of study

The scope of this project will be within the AI and e-business environment. This research paper is to identify the points that can help in building the effective intelligent Web based customer service. This intelligent Web based customer service will consist of following characteristics:

1. Intelligent agent response
   Agent can response to any questions that user ask (based on the scope only).
2. New knowledge phase addition by the expert based on the user request
   This agent will gather new technical knowledge for the expert to solve and update.
3. Complete discussion history during the communication.
   Provide the history of the chatting between the user and agent.

Under AI and e-business scope, the focus is more into providing customer service support through the Internet. This agent is to help the user to choose a good mobile phone based on user interest. The main focus is into one of popular model phone as there have lots of model available in the store. There are many reasons for the user to choose for this type of mobile phone but the focus only into the functionalities. There are 10 functionalities of the mobile phone, which are as below:

1. Adds on Camera
2. Bluetooth
3. Camera

4. Email
5. FM Radio
6. Internet Browser
7. Java TM Technology
8. MMS
9. Music Player
10. Video Service

1.4.1 The Relevancy of the Project

This project is very much related to the studies in Information Engineering. This project will combine knowledge management concepts for enhancing the e-business performance. We build the IA on the World Wide Web environment will create lots of opportunities in business, which not only the buying and selling process happened but also provide the customer with the efficient service and information.

1.4.2 The Feasibility of the Project within the Scope and Time Frame

Given only four months to complete the study, the scope of this project has to be reduced to accommodate the time frame. Having to fulfill the objectives within the time frame is manageable. This project will be mainly divided into two parts. The first part would be the documentations and research part and the second part will be the development of the system prototype.

CHAPTER 2

LITERATURE REVIEW AND THEORY

2.0 LITERATURE REVIEW AND THEORY

2.1 Introduction

Intelligent Web based customer service is a type of customer service that be done online. This research is more focusing into involving artificial intelligent technique in this customer service. There are many disciplines of artificial language to applied, but for this project it will involve expert system and natural language only. The prototype of this project is also known as intelligent agent. This agent will provide service to the customers such as solving the problems, giving information and others. In order to develop this agent, rule based knowledge is used in order to organize the data. This agent will operate independently in e-business environment. AI approaches will be applied in e-business hence AI is one of the vast and multi-disciplinary field of research nowadays.

2.1.1 E-business

E-business is defined as conducting business on the Internet. E-business is the transition of a business with the incorporating of e-commerce into the company's flow. E-commerce is the range of business activities that been handling online such as shopping and purchasing product [21]. Online shopping is when customers review the products or services on the Internet and they want to buy them, customers will place the products in an online shopping cart. When customers have done shopping and are ready to buy, customers just need to click on the purchase button. Customers are moved to a secure

location in order to proceed with the purchasing process. The customers need to give the supply address and also credit card number in order to complete the transaction. These are the basic processes of online shopping and purchasing process which referring to e-commerce. E-commerce is part of activities in e-business.

Why people choose to involve in e-business nowadays? It is because Internet is a low cost of standard, twenty-four hours availability and also has connectivity around the world [2]. Everybody in this world can access through the Internet. E-business is just not only selling and buying products, it also provide service to the customer. It is very important to serve your customer well. Just because someone visits your site, does not mean they will stay there or ever return again [16]. That is why it is important to have Web based customer service in e-business. This is to attract and create the loyal customer for the business.

2.1.1.1 Web based Customer Service

What is Web customer service? We can define it as customer service that provided on the Internet. Nowadays, there are many type of communication tools available in order to provide customer service such as e-mail, FAQs, phone, search function and others [2].

Customer service is an important strategy in business. As the technology keep improving from time to time, customer service on the Internet becomes popular and important as to attract customers. According to the history customer service become online, it has gain lots of benefits to the company.

At the early of the customer service become online, it brings lots of profit to the companies. In 1995 Jerry Neece, Sun Microsystems' senior product manager for the Internet product marketing, announced that putting customer service on the Web have saved Sun an estimated $1.3 million – in January of that year alone [4].

From one day to another, customer service grows up on the web. Cisco Systems estimates that in 1999 it achieved a savings of more than half a billion dollars by putting customer service on the Internet. In that year, 77% of all questions were handled online, and

customer satisfaction levels were up by 20% over 1995 [4]. Why is customer service becoming so important? It is because people are demanding it. *Information Week* magazine conducted a survey in the summer of 1999 asking consumers what mattered most when buying a personal computer. 69% said positive past experiences helped them make up their minds, while 73% said availability and on time delivery made the difference. But fully 80% agreed that service and support were the biggest reasons for making a buying decision. Then, 89% said that online technical support should be a standard feature with all computers [4]. Why the Web is the best place to put your customer service efforts at the moment? It is because it offers customers more of what they need such as twenty-four hours per week availability, limitless depth of knowledge and also the ability to remember customers as individuals.

Customer service been handled online has been proved that it is important in the business. Due to provide customer service that has intelligence approach and also interactive, AI is the suitable approach to be incorporate in e-business.

2.1.2 Artificial Intelligence

Artificial intelligence is a field of computer science that seeks to understand and implement computer based technology that can simulate characteristic of human intelligent and also human sensory capabilities. As define by Luger and Stubblefield,1993, AI is the branch of computer science that is concerned with the automation of intelligent of human behavior. There are four main possible goals to pursue in AI which as follows (Russel and Norvig) [22]:

- Systems that think like humans.
- System that think rationally.
- System that act like humans.
- System that act rationally.

As stated in the introduction section, the history of artificial intelligence started from 1950 which had been proposed by Alan Turing. The Turing Test was designed to provide a satisfactory operational definition of intelligence. Turing defined intelligent behavior as the

ability to achieve human ability in all cognitive tasks. Based on the Turing Test, machine would need to posses the following capabilities [22]:

- Natural language processing – this capabilities is to enable it to communicate in human language (English or other languages)
- Knowledge representation – this is to store information provided before or during interrogation
- Automated reasoning – this is to use the stored information to answer questions and to draw new conclusions
- Machine learning – it is to adapt to new circumstances and to detect and extrapolate patterns

AI can be classified into several approaches which are expert systems, natural languages, simulation of human sensory capabilities, robotics and neural networks. As stated before, this project is involving into expert systems and natural languages discipline.

2.1.2.1 Expert System

Expert systems are also known as knowledge based systems. They are computer systems that rely on a knowledge based of rules that lead to a specific purpose [23]. In rule based expert system, the domain knowledge is represented by a set of IF-THEN production rules and data is represented by a set of facts about the current situation. The inference engine compares each rule stored in the knowledge base with facts contained in the database. When the IF (condition) part of the rule matches a fact, the rule is fired and its THEN (action) part is executed [18]. The matching of the rule IF a part to the facts produces inference chain. Inference chain indicates how an expert system applies the rules to reach a conclusion. The inference engine must decide when the rules have to be fired. There are two principal ways in which rules are executed. One is call forward chaining and the other is backward chaining [18].

Expert systems are widely use in medical diagnosis and also financial industries. The main function of expert system is to troubleshoot problems, analyzing and diagnosing.

Expert systems are intelligent as they are able to solve problems [23]. Solving problems are the main focus of expert system. They are able to break a large problem into smaller part in order to achieve the possible solution. If the information is not very clear, expert systems will ask for clarification or further information. Expert system are not self aware in the human sense, but they are intelligent agents with a purpose.

2.1.2.2 Natural Language Systems

Natural language systems are systems that enable computers to accept, interpret, and execute instructions in natural language of the user. The purpose of this system is to create more interactive and communicative ways between users and computers [23]. Database query is the area that has the most natural language systems. Language and communication are the basic style for human to present any information between them. Sometimes miscommunication and misunderstanding also happens during the communication. Hence, to train the computer to communicate in human language is not an easy task.

During 1980's the dominant approach to knowledge acquisition required two kinds of highly trained, highly paid professionals. The process to control the natural languages is shown in the figure 2.1.2.2.1.

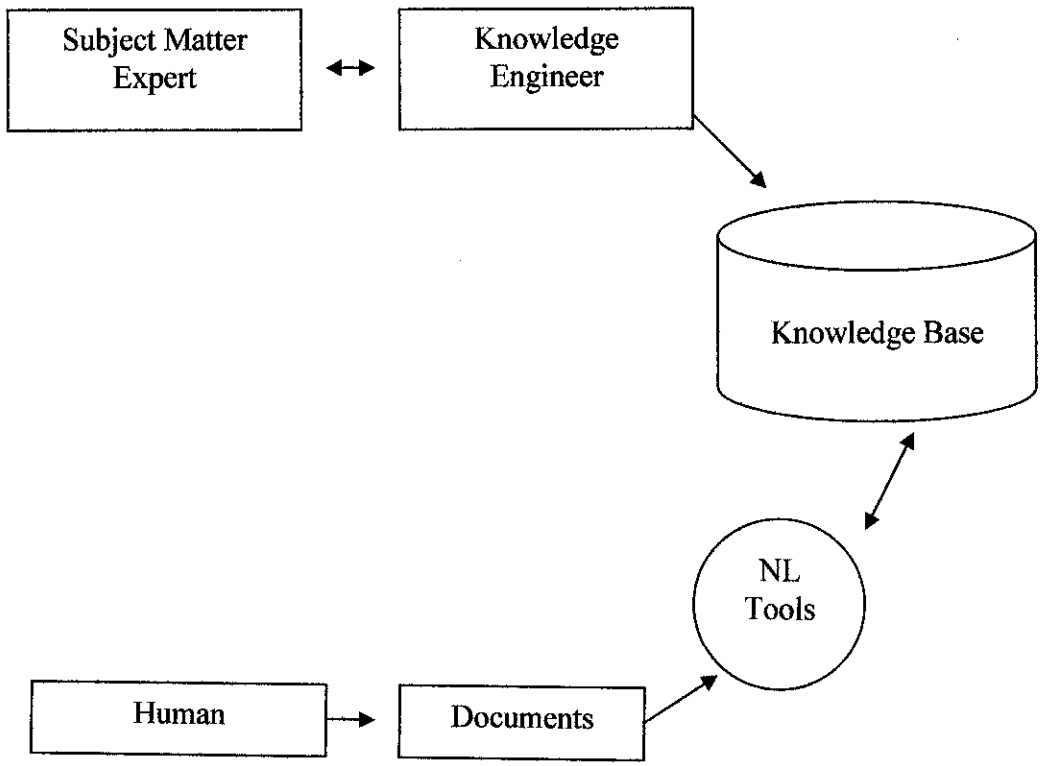

Figure 2.1.2.2.1 Natural language processing approach

Based on the figure 2.1.2.2.1, knowledge engineer interview subject matter expert in order to capture the knowledge and transform it into AI formats. Meanwhile, computational linguists, who were designing natural language tools, tried to make them translate NL documents into similar encodings without requiring any human intervention.

There are many forms of natural language systems such as parse the sentence and analyze its components and also use a script to formulate a suitable reply. The form by using script to formulate a reply is the form of ELIZA conversation systems which has been stated in the introduction section. ELIZA plays role of a Rogerian therapist [23]. ELIZA can hold a very realistic conversation in natural language. The biggest contribution to the evolution of machine intelligence by natural language is in the interaction between human and computer. With the combination of expert systems and natural language systems discipline into e-Business will lead to the developing of intelligent Web based customer service that can

functioning in problem solving, provide information and also as virtual guide for the website of the company.

2.1.3 Intelligent Web based Customer Service

Intelligent Web based customer service is an agent that is autonomous, proactive, utility-maximizing entity that has some capabilities and, given user preferences and goals, can autonomously plan and execute actions to achieve those goals effectively and efficiently. [10]. As explained in the previous chapter, this kind of customer service is using AI approaches.

Intelligent agent must have an equivalent source of info about the world in which it lives [7]. It means that the agent must be very informative and knowledgeable according the environment that it live. For example, if IA is in computer environment, it must have the information about the computer. With this, the IA will be intelligent enough to provide solutions for each of customer problems.

Intelligent agents can mentally figure out how to solve a problem before taking any action. They can do this because they have choice-they can choose from a range of competing possibilities to choose the one which will solve the problem. This allows them to generate complex scenarios which are specified to solve a problem. Intelligent agent does not need to have sense in the same way we do, but it still has to be able to gather information about its environment.

2.1.4 AI for E-business

AI involves in e-business as the new technology to enhance the effectiveness of Web customer service, which known as intelligent Web based customer service. The current customer service provides some value but is not very effective. AI approach will give advantages in e-business as the IA is very knowledgeable and informative. The use of IA is more suitable because it has better performance in responsiveness, accuracy, consistency,

user friendly system, twenty-four hours per week availability and it is also low in cost. The IA approach to e-business represents the most significant advancement in the market to date.

2.2 CONCLUSION

As a conclusion, intelligent Web based customer is important as a communication tools in handling customer service through Internet. The idea to incorporate AI with e-business is a good approach in enhancing the quality of the business towards to the future. Intelligent Web-based customer service is one of the steps to improving the business and technology for the future generation.

CHAPTER 3

METHODOLOGY

3.0 METHODOLOGY

For this research, the overall methodology to develop this intelligent Web-based customer service is defined as following:

1. Evaluation and Project Initiation Document (PID)
2. Requirement gathering
3. System development
    - Screen Design
    - Build Database
    - Coding
4. System testing
5. User acceptance test
6. Implementation
7. System monitoring and evaluation

3.0.1 Evaluation and PID

The first step to develop this system is evaluation of the system itself. Evaluation reflects the acceptance of the system by the end users and its performance in the field. Evaluate must be done is to show the usefulness of the system.

Evaluation addresses the issue "is the system valuable?" This is reflected by the acceptance of the system by its end users and the performance of the system in its application. Pertinent issues in evaluation are:

- Is the system user friendly, and do the users accept the system?
- Does the expert system offer an improvement over the practices it is intended to supplement?
- Is the system useful as a training tool?
- Is the system maintainable by other than the developers?

To illustrate the difference, the task might be to build a system that computes the serviceability coefficient of pavement.

In doing the evaluation, the factors that must be considered are as follows:

- costs of hardware and software - will vary despite identical functionality
- speed and capacity of hardware
- quality and costs of support

If the system is needed to be developed based on the evaluation result, then PID will be prepared.

The Project Initiation Document (PID) purpose is to define the project, to form the basis for its management and the assessment of overall success.

Essentially the PID describes the project. It is a high level document that provides the What (is to be built etc.), Why (the business case), When (timescales) and Whom (who is to do what).

The hardware and software that has been used in developing this system are as follows:

Hardware	**Software**
Pentium III 863MHz	PHP 4.3.10
RAM : 256 MB	Apache HTTP Server 1.3.33
Hard Disk : 60 GB	MySQL Servers and Clients 4.0.18
	MySQL Connector / ODBC

Table 3.0.1.1 Hardware and software specification

3.0.2 Requirement Gathering

Gathering requirements is a sortie into the unknown. There are many ways in gather the information. Lots of time is required in order to communicate with the users during requirement gathering phase. Online questionnaire is used to gather all the information for this project. Questionnaire has been sent to a number of people which there are no classification for the target user. This questionnaire is divided into three sections, which are Respondent's Background, mobile phone usage and Use of e-business on Internet. The reasons for using questionnaire in order to collect data are as follows:

1. The biggest single advantage is that a usability questionnaire gives feedback from the point of view of the user. If the questionnaire is reliable, and used it according to the instructions, then this feedback can be used as a trustworthy sample

2. Another important advantage is that measures gained from a questionnaire are to a large extent, independent of the system, users, or tasks to which the questionnaire was applied.

3. Additional advantage is questionnaires are usually quick; therefore it is cost effective to administer and score. Lots of data can be gathered using questionnaires as a surveys method. Of course, questionnaire data can be used as a reliable basis for comparison or for demonstrating that quantitative targets in usability have been met.

Besides, the data also has been gathered from the internet which from one of the popular mobile phone official website. The information that been gathered is all about the specification of those mobile phones.

Online questionnaire had been chose for the data collection method. The questionnaire has been distributed to many types of user. The questionnaire is divided into 3 sections which are to gather the respondent's background information, information about the mobile phone usage, and also the use of e-business through the Internet.

3.0.2.1 Respondent's Background

For this section, the respondent's information that been highlight as follows:

1. Age range
2. Gender
3. Race
4. Employment category

3.0.2.2 Mobile Phone Usage

The project scope is about consulting the user in choosing the most suitable mobile phone based on their interest. This section is more focusing in getting information of what requirement that respondent will choose in buying mobile phone.

3.0.2.3 Use of Internet in e-business

This section is to get the information of respondent usage of e-business on the Internet. This is to make survey how frequent respondent use Internet technology and how familiar them with the e-business.

3.0.3 System Development

3.0.3.1 Screen Design

This stage can be done concurrently with the database design. The screen design is done based on the requirements that have been gathered during the requirement gathering.

This system only requires a simple template layout. As the first step, the layout is coded using HTML code and preview it to others people in order to get any feedbacks. Some changes have been made based on the user comments. However, this layout still can be changed especially during the coding phase.

Multimedia elements also been considered in doing the screen design. The multimedia elements are such as the size, colors, type of fonts, the appropriate image to be used to attract user, and others.

There are a few type of font that has been applied in this system. The type of font is been classified as CSS style. It is important to have good font as it represent the information that will be read by the users. There are many types of font design nowadays and those designs are very interactive. But, for this system, the objective is to deliver the information and it is important to use font that can be readable and easy to read. The important characteristics that must be considered are size, font-type, color and font-style. Those characteristics can make the words are easy to be read. By using the font-style (eg. Bold,italic), some important words can be highlighted. Those types of fonts that been applied are listed as follows:

Font	Style
Title	Color : 000066, Font-family : Verdana, Size : 5
Body, p, td	Size : 11px, Color : 000000, Font-Family : Verdana, Arial, Tahoma
Text area	Font-weight: bold, Font-family: Arial, sans-serif, Font-size: 9pt
Text Box	Font-family: Arial, sans-serif, Font-size: 9pt

Table 3.0.3.1.1 Characteristics of font

Besides using appropriate font for having good usability design, the design of the interface is also must be considered. This system will be viewed by user in pop-up window form. The position and size of the window must be defined correctly. Based on the research, the window should pop-up at the center of the screen which user can be more alert. In order to make the window more decorative, some suitable images are included. For this web based customer service agent, it is suitable to put image of the agent. This is one of the psychological attractive which this can make the users feel like they communicating with real human.

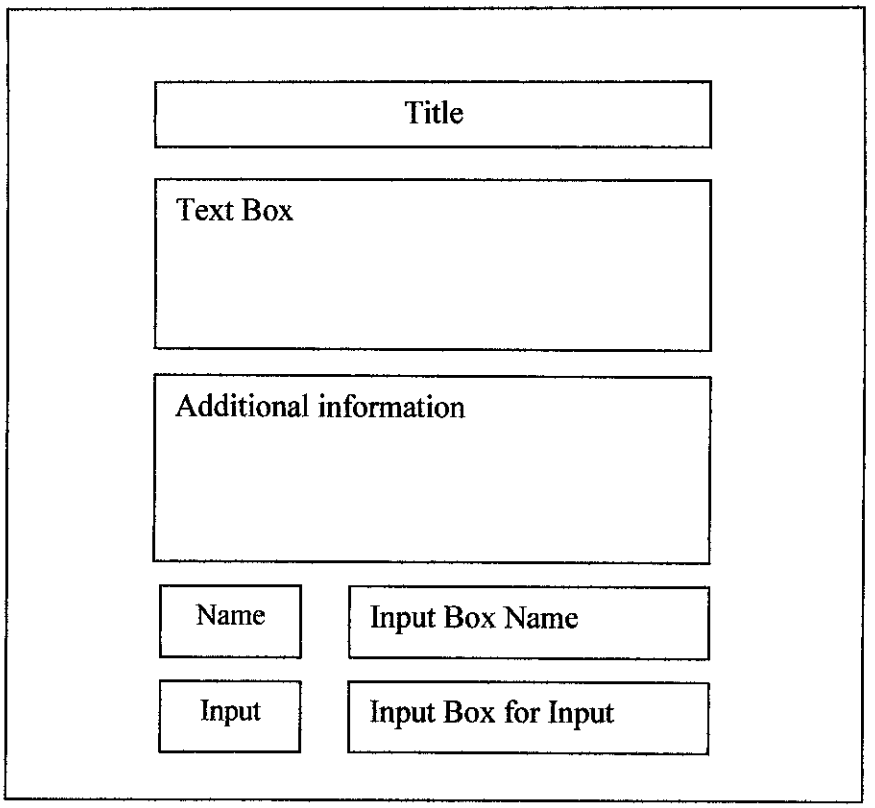

Figure 3.0.3.1.1 Layout of Intelligent Web based customer service

The details of the layout as follows:

Title: This will display the title of the project.

Text Box: This will display the conversation between the agent and the user.

Name:	This is the label for name
Input Box Name:	The user will write the name, which will representative them for this chatting.
Input:	This is a label for input.
Input Box for Input:	The user will write anything in the input box to be display at the **Text Box.**
Additional Information:	Here is the area that will display drop down list if there is any additional information.

3.0.3.2 Build Database

After the requirements gathering phase, proceed to build database phase. The database is drawn manually on the paper. After that, the tables are created in the database. Mysql application has been used for creating the database. The data type, size, NULL/NOT NULL for all the attributes have been identified during creating the tables. The primary key also been set, but it is not for all tables.

For the database, lookup table has been applied. Lookup table is a special tabular data file containing additional attributes for features stored in an associated feature attribute table. The table can be an external attribute table or an info table that describes coverage features. An info lookup table contains at least two items: the relate item and an item named either. Lookup table is a data structure, usually an array or associative array. Data structure is a way of storing data in a computer so that it can be used efficiently. Often a carefully chosen data structure will allow a more efficient algorithm to be used.

There are two types of database have been created, which for the development and production. For the coding phase, the development database will be used.

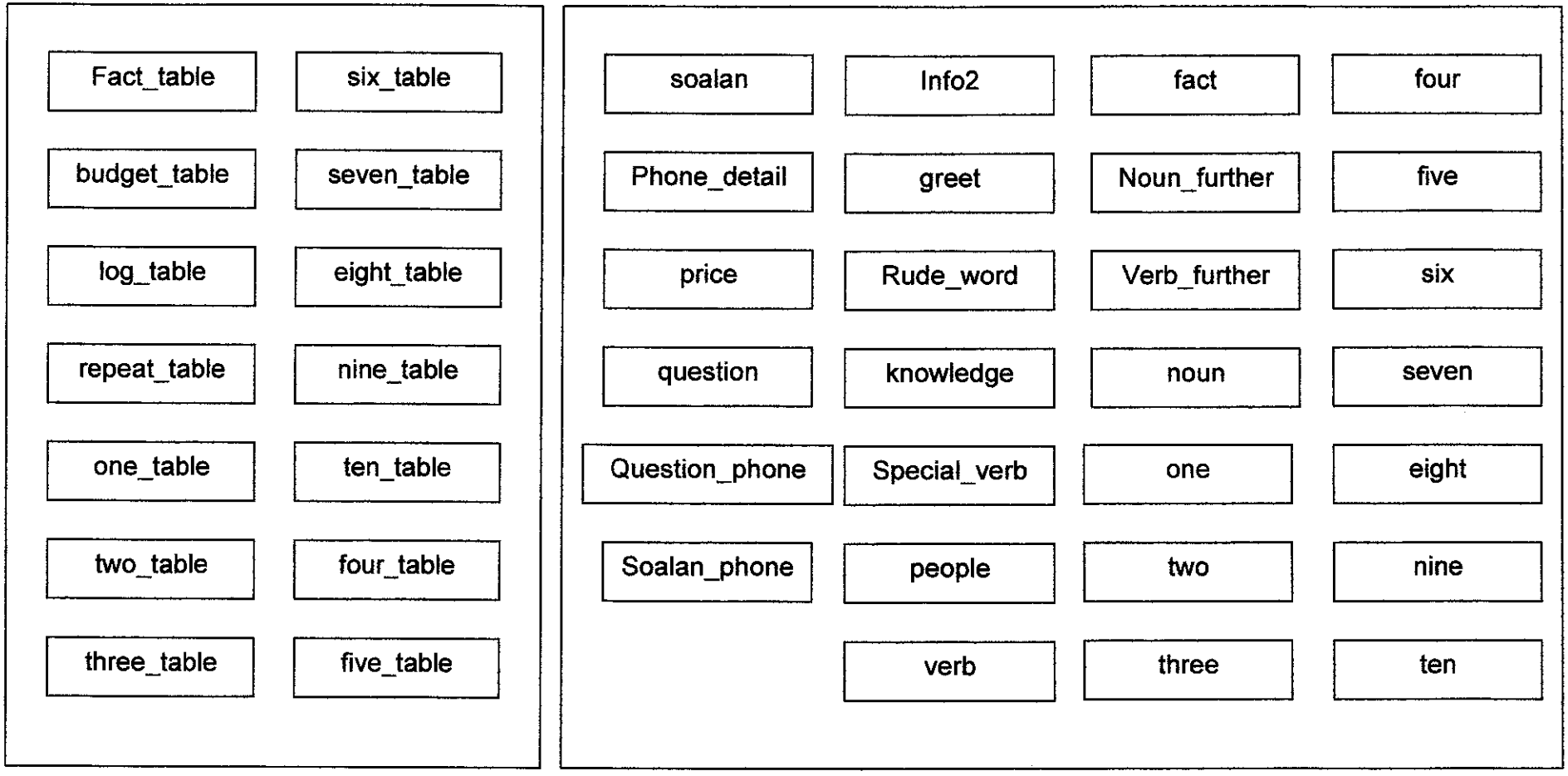

Figure 3.0.3.2.1 Database Design

3.0.3.3 Coding Phase

For the coding phase, PHP programming language has been used. There are 10 functionalities that will be considered by the system but as for the testing, only three functionalities have been tested. Those function are adds on camera, Bluetooth and Camera. Next figure shows the concept that has been applied in identifying those functions and at the end will produce the output. (Notes: 1 is adds on camera, 2 is Bluetooth, 3 is Camera, 4 is Email)

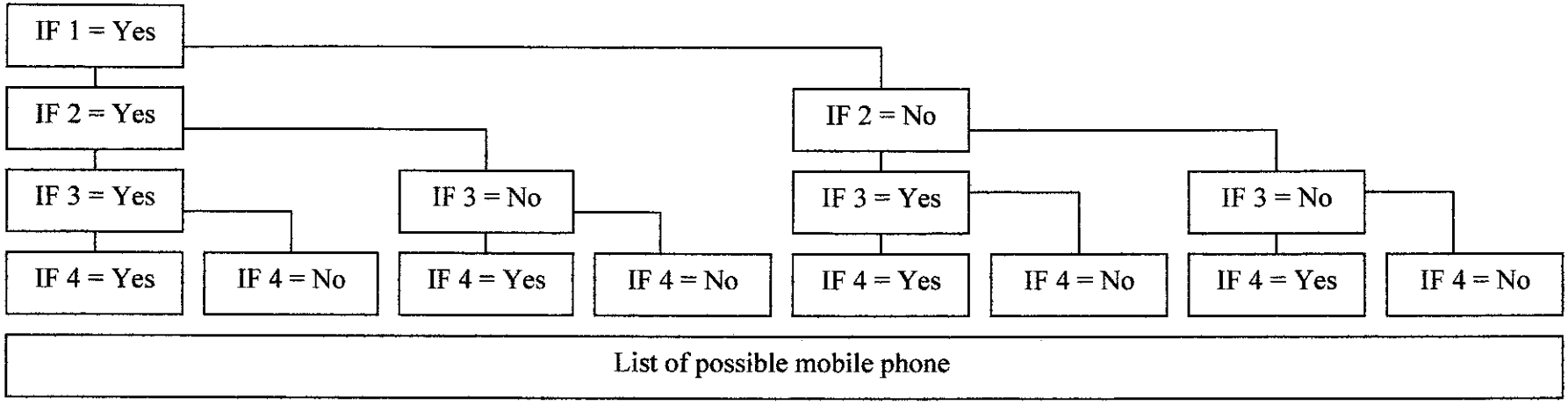

Figure 3.0.3.3.1.a Decision tree based on the 4 functionalities (the adds on camera is selected)

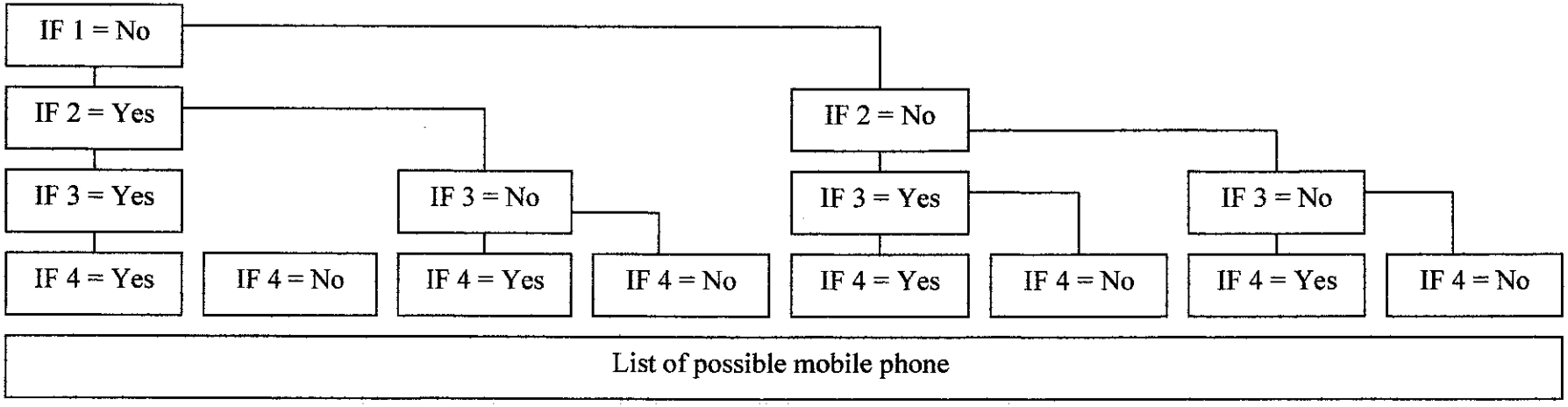

Figure 3.0.3.3.1.b Decision tree based on the 4 functionalities (the adds on camera is not selected)

Based on the figure 3.0.3.3.1.a and 3.0.3.3.1.b, user will select the check boxes of functionalities. If using the check box input, it means user can select more than one function. The pseudo code of the coding can be seen at the Appendix 3.0.3.3.a.

In the coding phase, many rules and requirements have been considered in developing this system. Those rules and requirements are as follows:

1. The checking for the greeting words.
2. The checking for the rude words.
3. Checking what type of input, such as question phrase. The checking been done are as follows :
   3.1 For this the input character-by-character will be check in order to identify the'?'. If there is '?' in the input, it will consider as question phrase.
   3.2 Check whether there is any WH kind of question. The WH words are stored in question table.
4. If user wants to ask something that is not stored in the database, this will consider as the new knowledge. The system will store the new knowledge in the knowledge table that will be updated later by the admin.
5. User can get help from the agent about the price and also how to take care of the mobile phone.
6. There is provided information of price and also branches of the shop by use magic word 'VIEW SARA PRICE ' and 'VIEW SARA SHOP'.
7. Checking for fact phrase as follows:
   7.1 Check whether there is any special verb (refer Appendix 3.0.3.2.a)
   7.2 Check the verb, noun and match with Lookup table. Answer can be retrieved from the Lookup table based on the matching verb and noun.
8. Check repeating words within two times conversation.

For the coding phase, some of PHP functions have been used. Those functions that have been used are as follows:

mysql_connect

This function is to open a connection to a MySQL Server. The syntax for this function is `$conn = mysql_connect ( "string server name"," string username"," string password" )`. The input in the bracket is based what have been defined during database creation. `$conn` is only a variable. If this function is not included in the coding, the system will not be connecting with the database. Due to that it will caused system error. There are many ways of coding to connect the system to the database. For this project, the syntax is embedded in the coding. Or else, it can be done in a separate file. In order to connect with the database, mysql_select_db is also an important syntax. The definition of this function is important for the use of other function such as `mysql_query`.

mysql_select_db("database_name",$var)

In designing the database, it must have a specific name to identify which database will be used for the system. This function sets the current active database on the server that's associated with the specified link identifier. For this project, the database name is 'agent'. For this function, the syntax is `mysql_select_db("agent", $conn)`. The `$conn` is the variable that been assigned for `mysql_connect` function. This is to link the correct database with the system.

array()

Array function in PHP is actually an ordered map. A map is a type that maps *values* to *keys*. This type is optimized in several ways, so you can use it as a real array, list, or stack of data. In this project, it is used as to store some temporary data. For example, the syntax is `$array = array( 1, 2 )`. The output for the array can be viewed as follows:

```
$array[0] = 1, $array[1] = 2
```

implode(string glue, array pieces)

This function is to join array elements with a string. The function returns a string containing a string representation of all the array elements in the same order, with the glue string between each element.

explode(string separator, string string [, int limit])

Explode function splits a string by string. It returns an array of strings, each of which is a substring of *string* formed by splitting it on boundaries formed by the string *separator*. If *limit* is set, the returned array will contain a maximum of *limit* elements with the last element containing the rest of *string*.

strlen(string str)

This function is to get the length of the string. For example, `$variable = strlen('abcdef')`. For the result, it will return `$variable` = 6.

substr (string string, int start [, int length])

It is to return portion of *string* specified by the *start* and *length* parameters. For example, `$variable = substr("abcdef", 0, 4)`. The output is `$variable = 'abcd'`. If *start* is non-negative, the returned string will start at the *start*'th position in *string*, counting from zero. For instance, in the string 'abcdef', the character at position 0 is 'a', the character at position 2 is 'c', and so forth.

mysql_query(string query [, resource link_identifier])

This function sends a query to the currently active database on the server that's associated with the specified link identifier. Example is as follows:

```
$result = mysql_query("SELECT my_col FROM my_tbl",$conn) or
die (mysql_error());
```

`$result` is the variable name. The query is to select a column from table. `$conn` is the link identifier to link the query to specified database.

mysql_num_rows(resource result)

mysql_num_rows() returns the number of rows in a result set. This command is only valid for SELECT statements. The syntax example is :

```
$result = mysql_query("SELECT my_col FROM my_tbl",$conn) or
die (mysql_error());
$num_rows = mysql_num_rows($result);
```

mysql_fetch_array(resource result [, int result_type])

mysql_fetch_array returns an array that corresponds to the fetched row, or FALSE if there are no more rows. In addition to storing the data in the numeric indices of the result array, it also stores the data in associative indices, using the field names as keys. The syntax is as follows:

```
$result = mysql_query("SELECT my_col FROM my_tbl",$conn) or
die (mysql_error());
$num_rows = mysql_num_rows($result);
$row = mysql_fetch_array($result);
```

count(string variable)

Count function returns the number of elements in *variable*, which is typically an array (since anything else will have one element).

```
$array = array( 1, 2 );
$count_array =  count($array);

The result is $count_array = 2.
```

mysql_close([resource link_identifier])

The function closes the connection to the MySQL server that's associated with the specified link identifier. If `link_identifier` isn't specified, the last opened link is used. This syntax usually been coded at the last part of the coding file.

3.0.4 System Testing

System testing is black box testing, performed by the author, and at the starting of the system testing, the complete system is configured in a controlled environment. The purpose of system testing is to validate an application's accuracy and completeness in performing the functions as designed. System testing simulates real life scenarios that occur in a "simulated real life" test environment and test all functions of the system that are required in real life. System testing is completed when actual results and expected results are either in line or differences are explainable or acceptable, based on client input.

System testing can also been done concurrently during the coding phase. For example, once one module has finished. The testing can be done by the author in ensuring the data is inserted in the correct database. With this testing the error can be discovered and fixed it quickly. This will save a lot of time.

3.0.5 User Acceptance Testing

The User Acceptance Testing method is performed to confirm that the application being tested meets its business requirements and to provide confidence that the system works correctly and is usable before it is formally delivered to live.

For this phase, online questionnaire has been prepared and distributed to the user. Since this system can be viewed within local area network, the target user is among the students and staffs of Universiti Teknologi Petronas only. The sample of questionnaire can be view at Appendix 3.0.5.a.

For the questionnaire, there are three sections of question for the user to answer. First is about the respondent's background. This is to gather the respondent's background information, feedback about the e-business website, and also feedback regarding intelligent Web based customer service prototype.

3.0.5.1 Respondent's background

For this section, the respondent's information that been highlight as follows:

1. Age range
2. Gender
3. Race
4. Employment category

3.0.5.2 Feedback about e-business website

For the prototype, the main website has been designed. This section is focusing to get user satisfaction about the website. The issues regarding the website that has been highlighted are as follows:

3.0.5.2.1 Information

Is the website provide enough and valid information? The question will be the main guide in developing this website. As generally known, e-business provides selling and buying through the internet. All those information need to be updated and valid. How the content analyst organized the information in the website is very important task. The information must be easy to understand by the user. The use of word and any other phrases need better concentration. The important information that can be included in the website is like information about the product, the company, the contact information and any news update.

3.0.5.2.2 The characteristics of website interface

This issue is more into human computer interaction concept. Users are asked regarding their satisfaction about the creativity and interactivity of the design layout. The elements that been under consideration is the type of font, image and also color. The characteristics that are also been considered are like whether the link functioning well, or is the 'tagboard' is needed in the website.

3.0.5.3 Feedback about intelligent Web based customer service

This section is to get the feedback about the performance of the agent. This feedback is based on the user experience in using the agent. The issues are regarding the response time for the agent in answering the question, the accuracy of the agent and also creativity in designing the agent.

Besides questionnaire, there is other UAT that has been done. For this testing, users are provided with test cases. Test cases are condition of case for the user to test. This can be assumed as the guidance for the user to do the testing. Besides doing the testing based on the test case, users also need to do extra testing by their own self. The users will be given about a week in order to do complete the UAT. After that, the changes are made based on the users' feedbacks. The difference between questionnaire and this test case is the questionnaire is to get the survey satisfaction of the system prototype overall without the guidance from the developer. But, for UAT using test case is more guided since the developer provide the input to be tested. User need to try those data and write down the answer that been answered by the agent. Users also need state whether they are satisfied with the answer or not. The sample of test case can be view at Appendix 3.0.5.b.

3.0.6 Implementation

Implementation is one of the most significant stages of system development. In the implementation phase our concerns is the construction of the new system, testing, and training. The final product must be complete before it can be delivered to its users/client. Implementation takes all the process, data, and the overall skeleton of the system, bringing it to life. Currently, this system is successfully implemented in local area network. For further enhancement, this system can be implemented to the world area network. Due for further enhancement, the specification of the hardware also need to be upgrade for better performance of the system.

3.0.7 System Monitoring and Evaluation

After the system already been implemented, the performance of the system needs to be monitored. Besides, it needs to update the knowledge of the system in order to make it more intelligent. The new knowledge is based on the user input while chatting with the agent. The new knowledge will be inserted into table knowledge as shown in figure 3.0.3.2.1. The administrator will update the new knowledge to the specific table.

CHAPTER 4

RESULT AND DISCUSSION

4.0 INTRODUCTION

There is two times where the online questionnaire had been done. Firstly during the data gathering phase and secondly is at UAT phase. The contents of both questionnaires have been explained in the previous chapter. Next section will be explained about the results of the survey for this project.

4.1 RESULTS AND DISCUSSION

4.1.1 Data Gathering phase questionnaire

The questionnaire is done because to survey the knowledge of the user about e-business. Based on the data gathered from the questionnaire, the respondents' respond have helped very much in doing this project. There are 57 of respondents that involved in the questionnaire. There is no specific population or random selection. The data from the respondents' respond have been analyzed and the results are as follows:

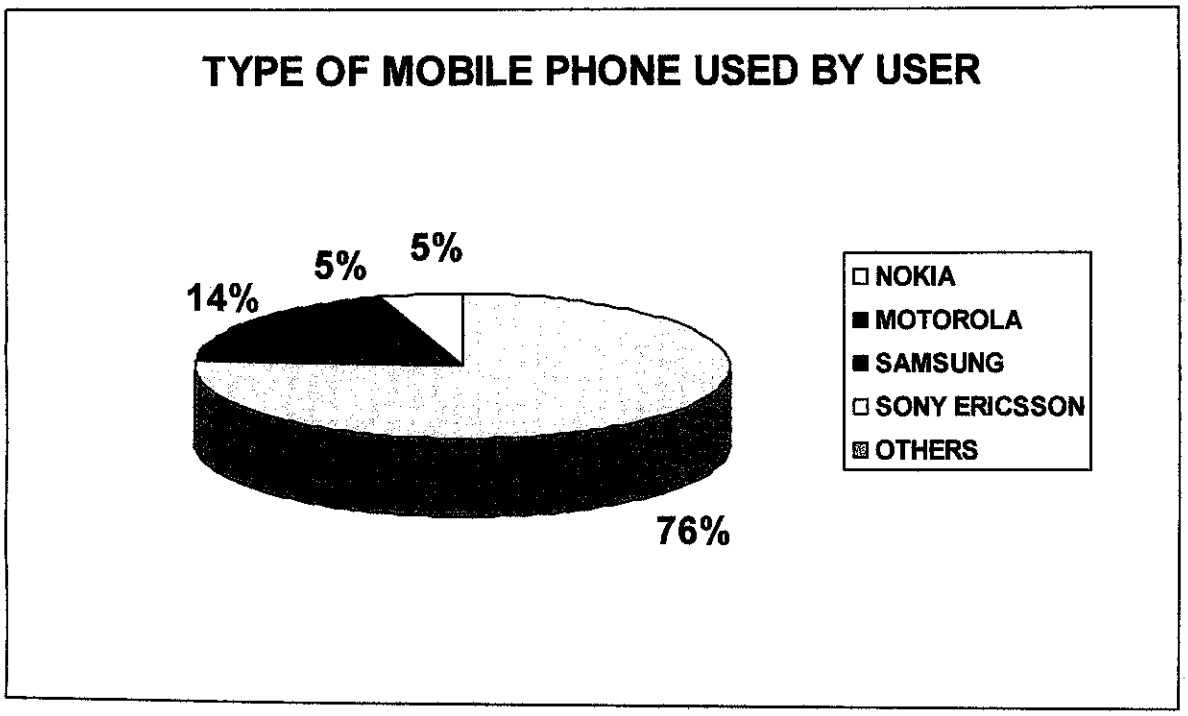

Figure 4.1.1.1 Type of mobile phone used by user

Figure 4.1.1.1 shows the percentage type of mobile phone that used by the respondents. There are many mobile phone models in the market but from the data analysis shows that there are 4 types of mobile phone that usually used by the user. Most of the respondents choose NOKIA mobile phone which it is 76% out of 100%. Motorola is the second most preferred with 14%. For Samsung and Sony Ericsson, each of them is 5%. Most of the users say that they choose NOKIA because it more user friendly and also most of people use it.

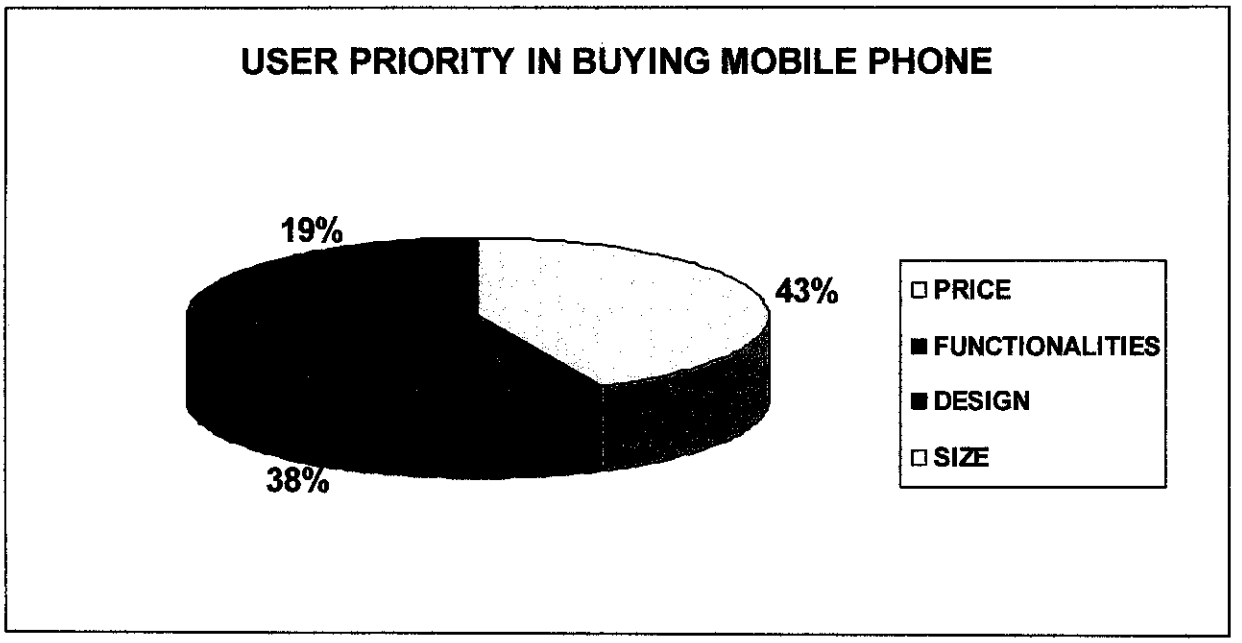

Figure 4.1.1.3 User priority in buying mobile phone

From the questionnaire, the respondents did been asked about their priority in buying mobile phone. Four options have been identified which are price, functionalities, design and size. Respondents need to rank the options based on their priority measured 1 as the most preferred and 4 as the least preferred. Based on the analyzed data gathered, the result is 43% of users choose price option as the most preferred factor in buying mobile phone. 38% of the users consider functionalities factor when buying new mobile phone. For design, 19% of users consider this factor.

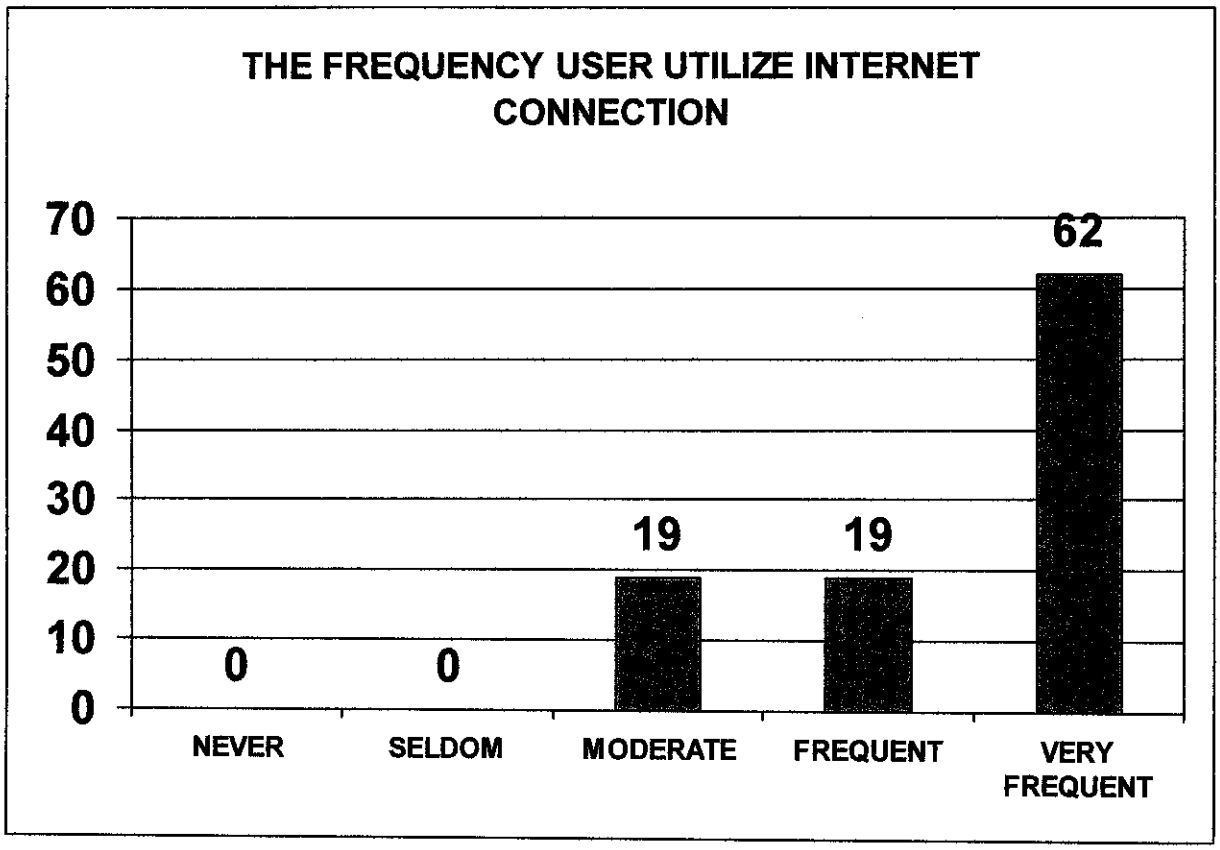

Figure 4.1.1.4 The frequency user utilize Internet connection

Figure 4.1.1.4 shows the frequency of users in utilize Internet connection. Based on the figure above, most of users use Internet very frequent which represented as 62%. For moderate and frequent, each of them shows that 19% of users utilize Internet. This shows that people nowadays are familiar with the enhancement of the technology as the internet becomes one of the important facilities to the people.

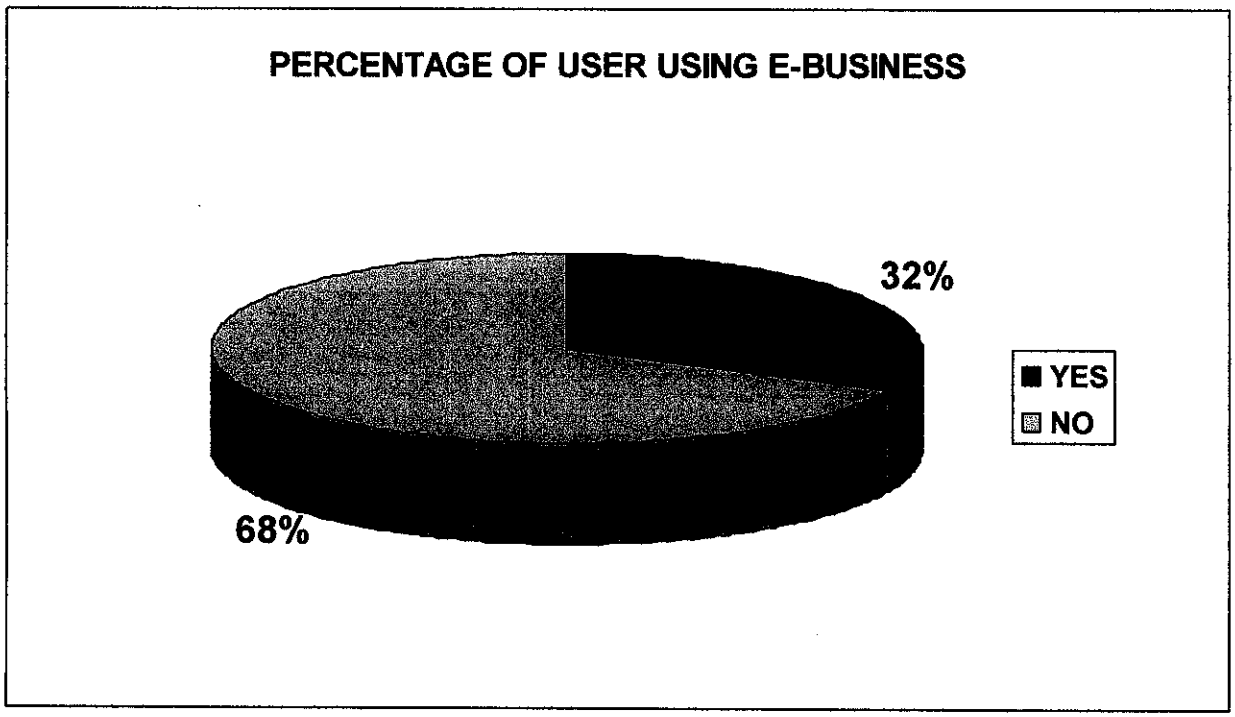

Figure 4.1.1.5 Percentage of user using e-business

Based on the figure 4.1.1.5, it shows the percentage of user in using e-business which it is one of the popular business strategies in the business nowadays. 68% of users says the never have experiences in using e-business which 32% of them says they have the experiences.

4.1.2 UAT phase questionnaire

For this phase, questionnaire is to survey the performance of the prototype that has been developed. It is also to measure the user satisfaction of this system. The users need to test and have experiences with this system before answering the questionnaire. There are 36 of respondents that involved in the testing. Those respondents are limited to university students only and it is random selection among the students. The results of this questionnaire are as follows:

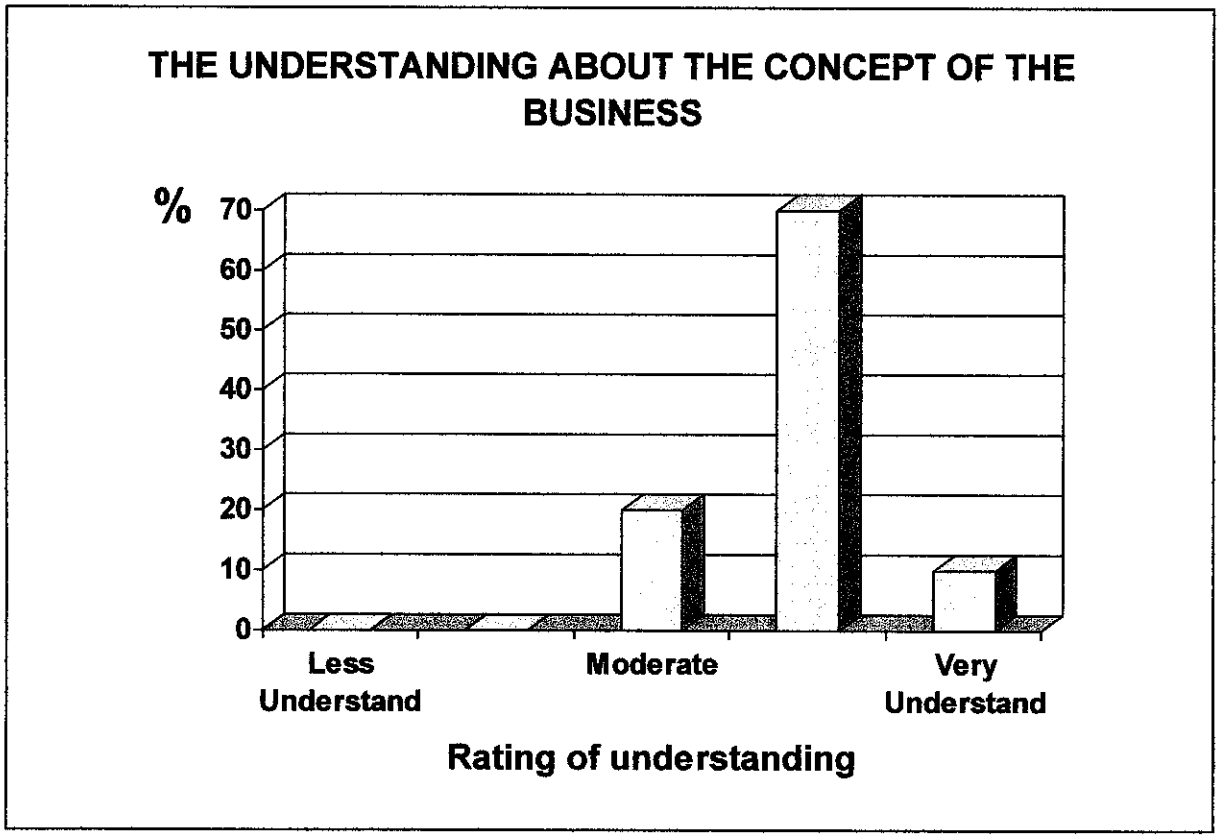

Figure 4.1.2.1 The understanding about the concept of the business

Figure above shows the percentage of the user understanding about the concept of business. This is to identify whether user is alert about the company information and also the product and service that the company is producing. Based on the questionnaire survey show that 20%

of the users moderately understand, 70% understand and 10% of users are very understood with the concept. The reason that users not very understand with the concept is the lack of information provided. Next graph will identify whether users understand with the information or not.

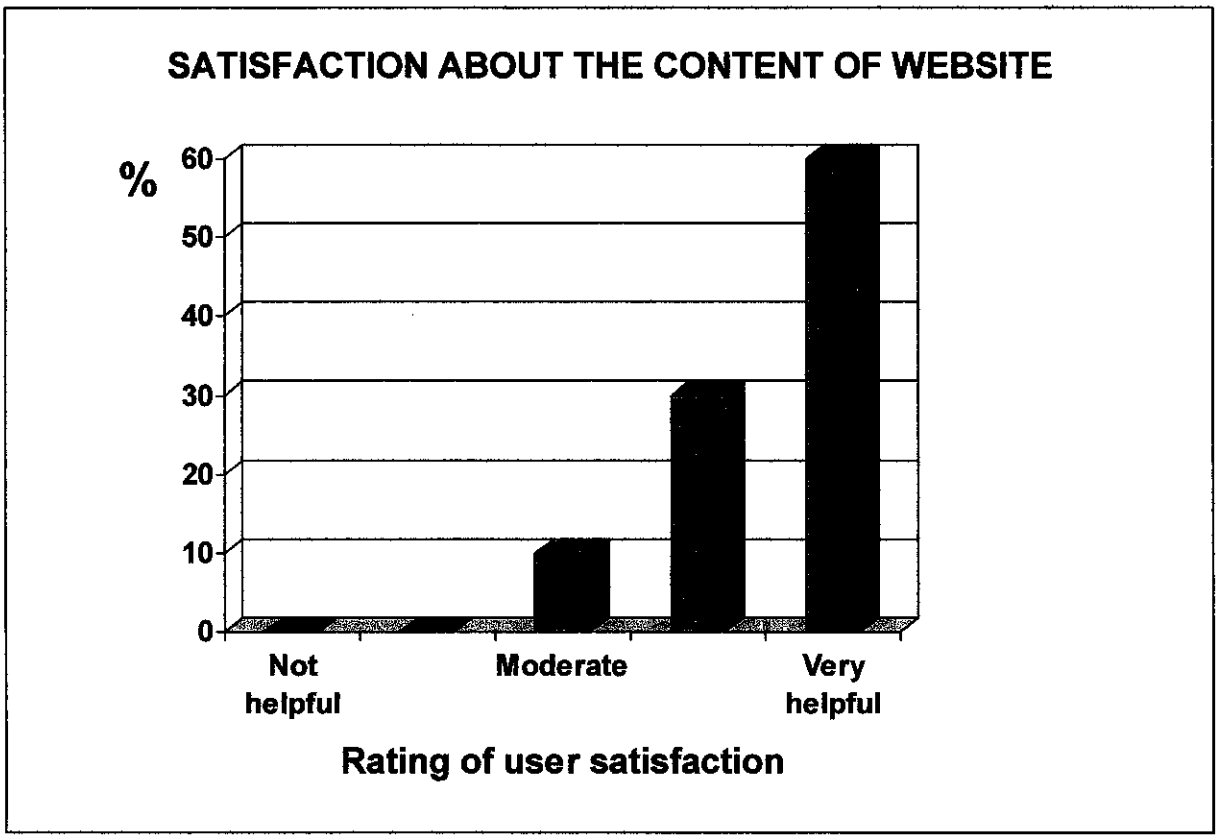

Figure 4.1.2.2 Satisfaction about the content of website

Figure 4.1.2.2 is about the rating of satisfaction from the user about the content of website. The content of the website is about the products, the company information, the news update, and also the information of Web based customer service. The information about this type of customer service is to make them alert with the service available. Based on the graph above shows 10% of the users are moderately satisfied with the content. Next, 30% of users are satisfied with the content and 60% are very satisfied. This shows that lack of information is not the reason why users don't understand the concept of the business.

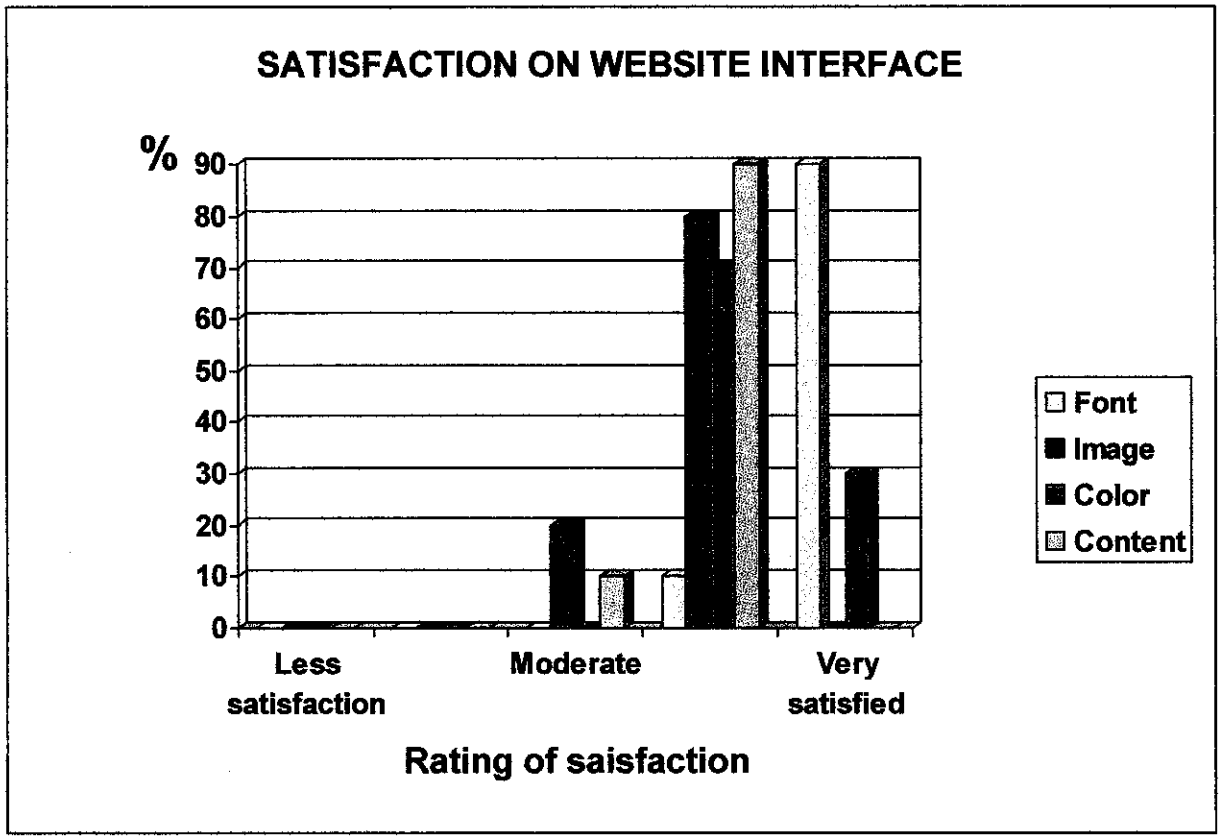

Figure 4.1.2.3 Satisfaction on website interface

Figure 4.1.2.3 is the survey of user satisfaction regarding website interface. The survey is regarding the multimedia elements that been applied in the website. Those elements are font, image, color and also the content. For font, the satisfaction of user is based on how easy the users can read the information provided. Most of the comments from the users are regarding the color of font, size of font and also the type of font. For this font element, 10% of users are satisfied with the usage and 90% are very satisfied. Due to the survey, the use of font in this system doesn't need lots of changes.

In this website, there is not many images have been used. Those images are image of banner, products and location of the company. 10% of users are moderately satisfied with those images. 90% of users are satisfied with the images. Most of the comments from the user said that more images should be added in the website to make it more attractive. For color, 70% of users satisfied and 30% are very satisfied. Some of the comments state that need to add

more attractive color. For the last media element that been survey is content of the website. The content is about the information been included, the navigation link and also the usage of 'tagboard'. 10% of users moderately satisfied with the content and 90 are satisfied. Most of them comment that they like the usage of 'tagboard' as it is one of the fast way to give feedback or discuss any topic regarding the products.

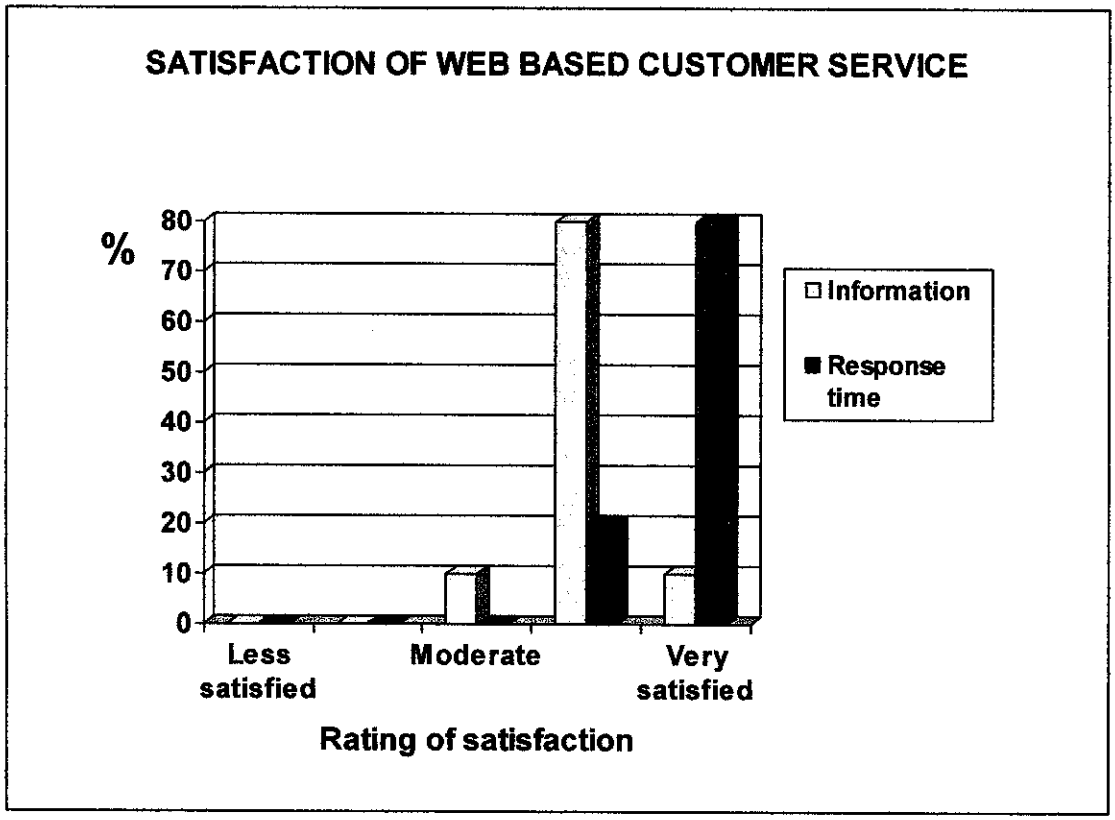

Figure 4.1.2.4 Satisfaction of Web based customer service

Next in figure 4.1.2.4 is the satisfaction of user based on their experienced in using this intelligent agent prototype. The survey is based on the information (answer) replied by the agent and the response time. 10% of users said that they are moderately satisfied with the agent. 90% are satisfied and 10% of users are very satisfied. Most of the comments state that this agent can be improved for excellent efficiency. For the response time, 20% are satisfied and 80% are very satisfied. The assumption here is the system is implemented locally within

the network and this will lead to better performance in response time. If the system will be implemented widely within WAN, it requires some changes in order to achieve better performance.

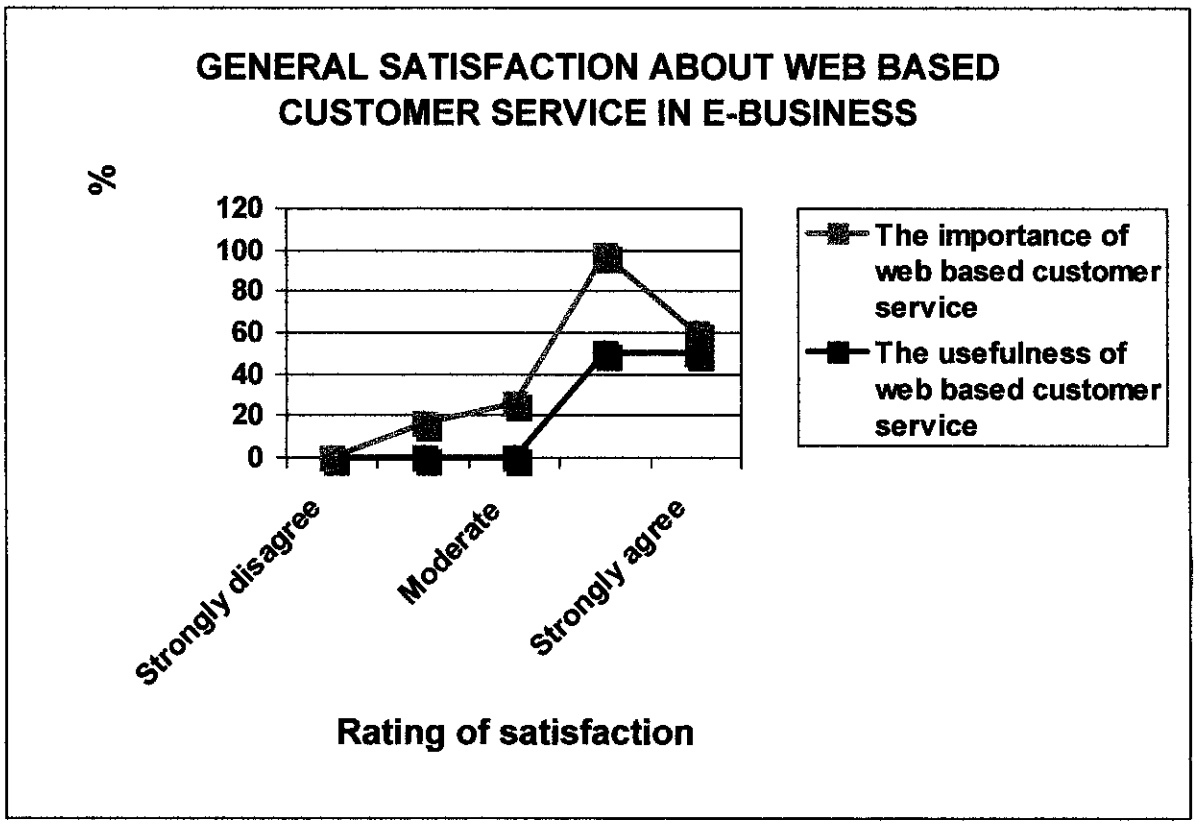

Figure 4.1.2.5 Satisfaction about Web based customer service in e-business

This last figure shows the survey of overall satisfaction of intelligent Web based customer service in e-business after the users experienced it. 8% of users said that this type of customer service is not important. The highest rate is 24% of them said that this customer service is important in e-business. For the usefulness of Web based customer service, half of them said that it is useful and the other half state that it is very useful.

4.2 CONCLUSION

Based on all those results of data gathering phase above, it can analyze that most of the respondents frequently used Internet connection but most of them never had experiences in using e-business. People involved in e-business because business through Internet can be available twenty-four hours per week. Besides, it also saves lots of time. However, the data analysis showing that the process to expand the technologies of e-business to the world still slow and need lots of promotion in order to attract user with this facilities. From the questionnaire, it also been discovered that most of the respondents not very understand with the term of e-business. Most of them thought that e-business is only buying and selling product online. However, e-business is more than that. E-business also provides information ad support service to the customers. Based on the analyzed data, it shows that most of them choose to listen to their colleagues' experiences in getting information of mobile phone rather than other sources available. However, they actually can get that information from the Internet but they don't. Why this happen? From the users say, most of the information in the Internet can't be trusted and sometimes they don't get the information that they want. Besides, users don't have time to read all those words website in getting that information.

From the results and discussion, certain factors have been identified which the cause most of the users do not use the e-business. The factors are as follows:

- Lack of information about e-business, which users do not really understand the concept of e-business.
- There are lack functionalities for the users to find specific information from the certain website.
- Some of the information in the website is not updated.
- Lack of promotion of the e-business itself.
- The e-business website not very attractive in order to attract the users.

After the analysis of second survey of complete prototype, customer service is important as it helps and guides users in buying products. The implemented of intelligent Web based customer service which combining the idea of AI into e-business is a good start in improving

the usage the customer service similar with the advance in the technology nowadays. However, it still needs lots of survey since this survey is conducted based on UTP residents only. It still needs to do other survey by testing the system in real e-business environment and the feedback of other types of users.

CHAPTER 5

CONCLUSION AND RECOMMENDATIONS

Based on the results and discussion, it shows that users nowadays have misunderstood of the e-business concept. E-business also provides the information and support service to the customers. That is what the focus of the project which developing Web based customer service in e-business, which provides the support service to the users. As for the recommendations, it is recommended to develop the IA into the e-business.

The integration of AI into e-business allows companies to exchange critical information with customers, partners, and suppliers for e-business optimization. The merger of e-business, AI and distributed computing technologies over TCP/IP-based platforms enables the creation of electronic markets in new types of products featuring both human and software agents as actors.

In order to develop IA into e-business, it must be considered the responsiveness, accuracy, consistency and also cost factors. The IA must be intelligent enough in order to help the user to solve problems.

The use of IA approach in the e-business with the lots of advantages of IA, will lead to enhancement in the technology aspect. Besides, it will also be the new trend of business strategies in order to sells products, provide information, support service and also attract the customers.

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APPENDICES

Appendix 3.0.3.2.a The datatype of database

INFO

FIELD	DATA TYPE
id	Varchar(20)
One	Varchar(1)
Two	Varchar(1)
Three	Varchar(1)
Four	Varchar(1)
Five	Varchar(1)
Six	Varchar(1)
Seven	Varchar(1)
Eight	Varchar(1)
Nine	Varchar(1)
Ten	Varchar(1)

GREET

FIELD	DATA TYPE
G_word	Varchar(20)

FUN_LS

FIELD	DATA TYPE
F_name	Varchar(50)
code	Varchar(10)

RUDE_WORD

FIELD	DATA TYPE
The_word	Varchar(20)
level	Varchar(20)

KNOWLEDGE

FIELD	DATA TYPE
input	Varchar(100)
Ip	Varchar(20)
id	Varchar(20)
Date_log	datetime
email	Varchar(20)

PEOPLE

FIELD	DATA TYPE
Ppl	Varchar(20)
Sthing	Varchar(20)

SPECIAL_VERB

FIELD	DATA TYPE
Verb	Varchar(20)
Sthing	Varchar(50)

VERB

FIELD	DATA TYPE
Verb	Varchar(20)
Sthing	Varchar(50)

VERB_FURTHER

FIELD	DATA TYPE
Verb1	Varchar(20)
Verb2	Varchar(30)
Sthing	Varchar(200)

QUESTION

FIELD	DATA TYPE
Question	Varchar(20)
Subject	Varchar(50)
Answer	Varchar(200)

QUESTION_PHONE

FIELD	DATA TYPE
question	Varchar(20)
Subject	Varchar(50)
answer	Varchar(200)

SOALAN

FIELD	DATA TYPE
Quest	Varchar(20)
Sthing	Varchar(20)

SOALAN_PHONE

FIELD	DATA TYPE
Quest	Varchar(20)
Sthing	Varchar(20)

FACT

FIELD	DATA TYPE
Word	Varchar(50)
answer	Varchar(50)

PHONE_DETAIL

FIELD	DATA TYPE
Size	Varchar(50)
weight	Varchar(50)
Java	Varchar(50)
mms	Varchar(50)
Email	Varchar(50)
Pic	Varchar(50)
Bluetooth	Varchar(50)
Internet	Varchar(50)
Camera	Varchar(50)
Video	Varchar(50)
Music	Varchar(50)
Radio	Varchar(50)
Ring tone	Varchar(50)
Price	Varchar(50)
phone	Varchar(50)

ONE

FIELD	DATA TYPE
Poss_hphone	Varchar(20)

TWO

FIELD	DATA TYPE
Poss_hphone	Varchar(20)

THREE

FIELD	DATA TYPE
Poss_hphone	Varchar(20)

FOUR

FIELD	DATA TYPE
Poss_hphone	Varchar(20)

FIVE

FIELD	DATA TYPE
Poss_hphone	Varchar(20)

SIX

FIELD	DATA TYPE
Poss_hphone	Varchar(20)

SEVEN

FIELD	DATA TYPE
Poss_hphone	Varchar(20)

EIGHT

FIELD	DATA TYPE
Poss_hphone	Varchar(20)

NINE

FIELD	DATA TYPE
Poss_hphone	Varchar(20)

TEN

FIELD	DATA TYPE
Poss_hphone	Varchar(20)

Appendix 3.0.3.2.b SQL syntax

```
mysql > use agent;
Database changed
mysql > create table log (
mysql > id              Varchar(20),
mysql > no_line         Int,
mysql > date_log        Datetime,
mysql > Ip              Varchar(20),
mysql > Name            Varchar(50),
mysql > Input           Varchar(100),
mysql > Solve           Varchar(1));


mysql > create table info (
mysql > id              Varchar(20),
mysql > satu            Varchar(20),
mysql > dua             Varchar(20),
mysql > tiga            Varchar(20),
mysql > empat           Varchar(20),
mysql > lima            Varchar(20),
mysql > enam            Varchar(20),
mysql > tujuh           Varchar(20),
mysql > lapan           Varchar(20),
mysql > sembilan        Varchar(20),
mysql > sepuluh         Varchar(20));


mysql > create table fun_ls (
mysql > f_name          Varchar(50),
mysql > code            varchar(10));

mysql > create table fun_desc (
mysql > f_name          Varchar(50),
mysql > description     varchar(200));

mysql > create table rude_word (
mysql > the_word        Varchar(20),
mysql > level           varchar(20));

mysql > create table knowledge (
mysql > input           varchar(100),
mysql > ip              varchar(20)
mysql > id              varchar(20)
mysql > date_log        datetime,
mysql > email           varchar(20));
```

```
mysql > create table question (
mysql > question      varchar(20),
mysql > subject       varchar(50)
mysql > answer        varchar(200));
```

Appendix 3.0.3.3.a Pseudocode

If function1 is selected {

Create temporary table_mobile_phone1 based on the userid;

Get the list of possible mobile phone from the database from function1 table;

Insert the selected list of mobile phone into the temporary table_mobile_phone1;

If function2 is selected {

Create temporary table_mobile_phone2 based on the userid;

Get the list of possible mobile phone from the database by comparing the list of possible mobile phone in temporary table_mobile_phone1 with in function2 table;

Insert the selected list of mobile phone into the temporary table_mobile_phone2;

If function3 is selected {

Create temporary table_mobile_phone3 based on the userid;

Get the list of possible mobile phone from the database by comparing the list of possible mobile phone in temporary table_mobile_phone2 with in function3 table;

Insert the selected list of mobile phone into the temporary table_mobile_phone3;

Display the output of the list possible mobile phone from temporary table_mobile_phone3;

Drop temporary table_mobile_phone1;

Drop temporary table_mobile_phone2;

Drop temporary table_mobile_phone3;

} else if function3 is not selected {

Display the output of the list possible mobile phone from temporary table_mobile_phone2;

Drop temporary table_mobile_phone1;

Drop temporary table_mobile_phone2;

}

} else if function2 is not selected {

if function3 is selected {

Create temporary table_mobile_phone3 based on the userid;

Get the list of possible mobile phone from the database by comparing the list of possible mobile phone in temporary table_mobile_phone1 with in function3 table;

Insert the selected list of mobile phone into the temporary table_mobile_phone3;

Display the output of the list possible mobile phone from temporary table_mobile_phone3;

Drop temporary table_mobile_phone1;

Drop temporary table_mobile_phone3;

} else if function3 is not selected {

Display the output of the list possible mobile phone from temporary table_mobile_phone1;

Drop temporary table_mobile_phone1;

}

}

} else if funcion1 is not selected {

if function2 is selected {

Create temporary table_mobile_phone2 based on the userid;

Get the list of possible mobile phone from the database from function2 table;

Insert the selected list of mobile phone into the temporary table_mobile_phone2;

If function3 is selected {

Create temporary table_mobile_phone3 based on the userid;

Get the list of possible mobile phone from the database by comparing the list of possible mobile phone in temporary table_mobile_phone2 with in function3 table;

Insert the selected list of mobile phone into the temporary table_mobile_phone3;

Display the output of the list possible mobile phone from temporary table_mobile_phone3;

Drop temporary table_mobile_phone2;

Drop temporary table_mobile_phone3;

} else if function3 is not selected {

Display the output of the list possible mobile phone from temporary table_mobile_phone2;

Drop temporary table_mobile_phone2;

}

} else if function2 is not selected {

if function3 is selected {

Create temporary table_mobile_phone3 based on the userid;

Get the list of possible mobile phone from the database from function3 table;

Insert the selected list of mobile phone into the temporary table_mobile_phone3;

Display the output of the list possible mobile phone from temporary table_mobile_phone3;

Drop temporary table_mobile_phone3;

} else if function3 is not selected {

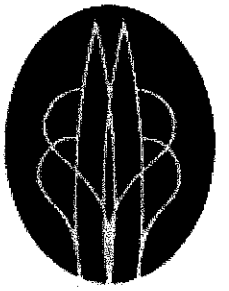
"Please choose any function";

}

}

}

Appendix 4.0.a Questionnaire sample



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JANUARY 2005 FINAL YEAR PROJECT

'INTELLIGENT WEB BASED CUSTOMER SERVICE IN E-BUSINESS'

KYAIRIYATUL AINI ABDUL WAHAB
2584
INFORMATION TECHNOLOGY
kyairiyatul_aini@yahoo.com

Pendahuluan / *Preface :*

Internet merupakan salah satu teknologi terkini yang menghubungkan orang ramai yang berada jauh diantara satu sama lain, 24 jam seminggu. Teknologi internet juga telah digunakan secara meluas bagi pengusaha-pengusaha bisnes yang juga dikenali sebagai *'e-bisnes'*. Pengusaha-pengusaha bisnes mempromosikan barangan, menyediakan informasi, menyediakan khidmat jual beli secara 'online' and juga khidmat sokongan pelanggan.

Tujuan kaji selidik ini diadakan adalah untuk mengetahui tahap penerimaan orang ramai terhadap khidmat e-bisnes serta mengenal pasti punca-punca yang menyebabkan orang ramai kurang menggunakan khidmat e-bisnes. Selain itu, kaji selidik ini juga dilakukan untuk mendapatkan maklumat tentang ciri-ciri pilihan pelanggan dalam membeli telefon mudah alih, dimana ini adalah untuk memenuhi skop projek.

Internet is one of the important technology that connecting far distance people, twenty-four hours per week. Internet has been used in the business environment, which we called it as e-business. All the entrepreneurs use e-business to promote their products, provide the information of the products, selling product online and also provide the support service.

The objective of this survey is to study the acceptance of citizens towards the e-business initiatives as well as determining the factors causing a low usage of e-business services among the citizens. Besides, this survey also to get the most user's specification in buying mobile phone.

SEKSYEN A : LATAR BELAKANG RESPONDEN
SECTION A : RESPONDENT'S BACKGROUND

Arahan / *Instruction :*
Sila **tebalkan ('bold')** jawapan anda ./ *Please **bold** your answers.*

1. Lingkungan umur / *age range*
   - ☐ > 15 tahun / years
   - ☐ 15 – 20 tahun / years
   - ☐ 21 – 25 tahun / years
   - ☐ 26 – 30 tahun / years
   - ☐ 30 – 35 tahun / years
   - ☐ 36 – 40 tahun / years
   - ☐ 41 – 45 tahun / years
   - ☐ 46 – 50 tahun / years
   - ☐ 51 – 55 tahun / years
   - ☐ 56 – 60 tahun / years
   - ☐ > 60 tahun /years

2. Jantina / Gender
   - ☐ Lelaki / Male
   - ☐ Perempuan / Female

3. Bangsa / Race
   - ☐ Melayu / *Malay*
   - ☐ Cina / *Chinese*
   - ☐ India / *Indian*
   - ☐ Siam / *Siamese*
   - ☐ Bumiputera Sabah atau Sarawak / *Sabahan or Sarawakian bumiputeras*

4. Kategori pekerjaan / *Employment kategori*
   - ☐ Perbankan atau kewangan / *Banking or finance*
   - ☐ Pengurusan / *Administration*
   - ☐ Sektor Pendidikan / Education sector
   - ☐ Eksekutif / *Executive*
   - ☐ Perniagaan / Business
   - ☐ Pelajar / Student
   - ☐ Pelatih / *Trainee*
   - ☐ Bekerja sendiri / *Self employed*
   - ☐ Pesara / *Retiree*
   - ☐ Ditanggung oleh pasangan / *Supported by partner*
   - ☐ Lain-lain (sila nyatakan) / *Others (please specifi) :* _____

SEKSYEN B : PENGGUNAAN TELEFON MUDAH ALIH
SECTION B : MOBILE PHONE USAGE

Arahan / *Instruction :*
Sila **tebalkan ('bold')** jawapan anda ./ *Please* ***bold*** *your answers.*

1. Apakah model telefon mudah alih anda ? / *What is the brand of your mobile phone ?*

   ☐ Nokia
   ☐ Samsung
   ☐ Sony Ericsson
   ☐ Motorola
   ☐ Panasonic
   ☐ Other (pls. specify) _____

2. Dari manakah anda mendapatkan maklumat sebelum membeli telefon mudah alih yang baru? / *Where do you get the information before buying new mobile phone?*

   ☐ Televisyen / Television
   ☐ Radio / Radio
   ☐ Majalah / Magazines
   ☐ Rakan / Colleagues
   ☐ Internet /Internet
   ☐ Lain-lain (sila nyatakan) / Others (please justify) : _____

3. Apakah keutamaan anda dalam membeli telefon mudah alih?
   (Pilih keutamaan anda, 1 adalah paling anda pilih dan 4 paling kurang menjadi keutamaan anda)
   What is your priority in buying mobile phone?
   (Rank your priority, 1 being the most preferred choice and 4 being the least preferred)

   ☐ Harga / *Price* ___
   ☐ Rekaan / *Design* ___
   ☐ Fungsi / *Functionalities* ___
   ☐ Saiz / *Size* ___

4. Apakah pilihan had harga dalam membeli telefon mudah alih? / *What range of price that you prefer?*
   (Sila tanda [/] satu sahaja) / *(Please tick [/] one only)*

   ☐ > RM 1500 ___
   ☐ RM 1000 – RM 1500 ___
   ☐ RM 500 – RM 999 ___
   ☐ < RM 500 ___

5. Kenapa anda memerlukan telefon mudah alih? / *Why do you need to use mobile phone?*
   (Sila tanda [/] satu sahaja) / *(Please tick [/] one only)*

   ☐ Bisnes / *Business* ___
   ☐ Hiburan / *Entertainment* ___
   ☐ Bersosial / *Socializing* ___
   ☐ Kegunaan asas / *Basic Usage* ___

6. Apakah rekaan telefon mudah alih yang anda pilih? (Sila tanda [/] satu sahaja)
   What design of mobile phone that you prefer? (Please tick [/] *one only)*

   ☐ Tradisional / *Traditional* ___

- ☐ Moden / *Modem* ___
- ☐ Ala Sukan / *Sport Casual* ___
- ☐ Stylish ___

7. Apakah fungsi telefon mudah alih yang anda utamakan ? (Anda boleh pilih [/] lebih dari satu)
What functionalities below that you prefer? (You can choose [/] more than one)

- ☐ Adds on Camera ___
- ☐ Bluetooth ___
- ☐ Camera ___
- ☐ Email ___
- ☐ FM Radio ___
- ☐ Internet Browser ___
- ☐ Java TM Technology ___
- ☐ MMS ___
- ☐ Music Player ___
- ☐ Video Service ___

SEKSYEN C : PENGGUNAAN KHIDMAT BISNES MELALUI INTERNET (E-BISNES)
SECTION C : USE OF ELECTRONIC BUSINESS ON THE INTERNET (BUSINESST SERVICES)

Arahan / *Instruction :*
Sila **tebalkan ('bold')** jawapan anda ./ *Please **bold** your answers.*

1. Sekerap manakah anda menggunakan perkhidmatan internet? /
How frequent do you utilize Internet connection ?

☐	☐	☐	☐	☐
1	2	3	4	5
Langsung tidak *Never*		Sederhana *Moderate*		Sangat kerap *Veryfrequent*

2. Adakah anda menyedari bahawa wujudnya perkhidmatan bisnes melalui Internet (e-bisnes) /
Are you aware of the business services through Internet (e-business) ?

- ☐ Ya / *Yes*
- ☐ Tidak / *No*

(Jika jawapan anda tidak, sila abaikan soalan 3 hingga soalan 5 dan teruskan ke soalan 6. /
If your answer is no, skip questions 3 up to question 5and proceed to question 6)

3. Pernahkah anda menggunakan khidmat e-bisnes? /
Have you ever use e-business ?

- ☐ Ya / *Yes (sila nyatakan perkhidmatan yang digunakan dan sebab / please state which services was used and the reason)*

_____

- ☐ Tidak / *No (sila nyatakan / justify your reasons)*

_____

(Jika jawapan anda tidak, sila abaikan soalan 4 hingga soalan 5 dan teruskan ke soalan 6. /
If your answer is no, skip questions 4 up to question 5 and proceed to question 6)

4. Adakah anda berjaya mendapatkan apa yang anda mahukan daripada khidmat e-bisnes tersebut / *Did you manage to get what you were looking for in the e-business services?*
   ☐ Ya / *Yes*

   ☐ Tidak / *No*

5. Pernahkah anda mengalami kesulitan ketika meggunakan perkhidmatan e-business / Have *you had any negative experience while using e-business services?*

   ☐ Ya / *Yes*

   ☐ Tidak / *No*

Sila jawab soalan-soalan berikut sekalipun anda tidak pernah menggunakan khidmat. Pendapat anda sangat dihargai.
Answer the following questions regardless of whether you have ever used e-bisnes services. Your opinion is very much appreciated.

6. *Perkhidmatan e-bisnes memudahkan anda mencari informasi dan melakukan urusan jual-beli / E-business servide make it easier to find what information that you want and also do the trading process.*

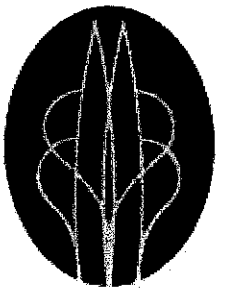
☐	☐	☐	☐	☐
1	2	3	4	5
Langsung tidak setuju *Strongly disagree*		Sederhana *Moderate*		Sangat setuju *Strongly agreee*

7. Adakah penting bagi anda khidmat e-bisnes disediakan? / *How important is it to you that e-business service on the Internet?*

☐	☐	☐	☐	☐
1	2	3	4	5
Langsung tidak penting *Not important at all*		Sederhana *Moderate*		Sangat penting *Extremely important*

Soalan kajiselidik tamat. Terima kasih atas kerjasama yang diberikan
End of questionnaire. Thank vou very much or vour cooperation.

Appendix 3.0.5.a Questionnaire sample for user acceptance testing



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KYAIRIYATUL AINI ABDUL WAHAB
2584
INFORMATION TECHNOLOGY
kyairiyatul_aini@yahoo.com

Pendahuluan / *Preface :*

Internet merupakan salah satu teknologi terkini yang menghubungkan orang ramai yang berada jauh diantara satu sama lain, 24 jam seminggu. Teknologi internet juga telah digunakan secara meluas bagi pengusaha-pengusaha bisnes yang juga dikenali sebagai *'e-bisnes'*. Pengusaha-pengusaha bisnes mempromosikan barangan, menyediakan informasi, menyediakan khidmat jual beli secara 'online' and juga khidmat sokongan pelanggan.

Satu prototaip sistem e-bisnes telah dibina untuk projek ini. Tujuan kaji selidik ini diadakan adalah untuk mengetahui tahap maklum balas dan kepuasan orang ramai terhadap khidmat e-bisnes berdasarkan prototaip yg telah dibina ini. Selain itu, kaji selidik ini juga dilakukan untuk mendapatkan cadangan-cadangan bagi menambah kecekapan system ini.

Internet is one of the important technology that connecting far distance people, twenty-four hours per week. Internet has been used in the business environment, which we called it as e-business. All the entrepreneurs use e-business to promote their products, provide the information of the products, selling product online and also provide the support service.

A prototype has been developed based on the requirements that have been gathered before.The objective of this survey is to get feedbacks and survey the satisfaction of citizens towards the prototype. Besides, this survey also to get more opinions from the citizens to improve the efficiency of the system.

SEKSYEN A : LATAR BELAKANG RESPONDEN
SECTION A : RESPONDENT'S BACKGROUND

Arahan / *Instruction :*
Sila **tebalkan ('bold')** jawapan anda ./ *Please **bold** your answers.*

1. Lingkungan umur / *age range*
   - ☐ > 15 tahun / years
   - ☐ 15 – 20 tahun / years
   - ☐ 21 – 25 tahun / years
   - ☐ 26 – 30 tahun / years
   - ☐ 30 – 35 tahun / years
   - ☐ 36 – 40 tahun / years
   - ☐ 41 – 45 tahun / years
   - ☐ 46 – 50 tahun / years
   - ☐ 51 – 55 tahun / years
   - ☐ 56 – 60 tahun / years
   - ☐ > 60 tahun /years

2. Jantina / Gender
   - ☐ Lelaki / Male
   - ☐ Perempuan / Female

3. Bangsa / Race
   - ☐ Melayu / *Malay*
   - ☐ Cina / *Chinese*
   - ☐ India / *Indian*
   - ☐ Siam / *Siamese*
   - ☐ Bumiputera Sabah atau Sarawak / *Sabahan or Sarawakian bumiputeras*
   - ☐ Lain-lain (sila nyatakan) / *Others (please specific) :* _____

4. Kategori pekerjaan / *Employment kategori*
   - ☐ Perbankan atau kewangan / *Banking or finance*
   - ☐ Pengurusan / *Administration*
   - ☐ Sektor Pendidikan / Education sector
   - ☐ Eksekutif / *Executive*
   - ☐ Perniagaan / Business
   - ☐ Pelajar / Student
   - ☐ Bekerja sendiri / *Self employed*
   - ☐ Lain-lain (sila nyatakan) / *Others (please specific) :* _____

SEKSYEN B : MAKLUM BALAS LAMAN WEB
SECTION B : WEBSITE FEEDBACK

Arahan / *Instruction :*
Sila **tebalkan ('bold')** jawapan anda ./ *Please* ***bold*** *your answers.*

8. Adakah anda faham dengan konsep bisnes ini ? / *Do you understand with the concept of this business?*

1	2	3	4	5
Langsung tidak *Never*		Sederhana *Moderate*		Sangat Faham *Very Understand*

9. Adakah maklumat dalam laman web ini membantu anda? / *Is the website content very helpful ?*

1	2	3	4	5
Langsung tidak *Never*		Sederhana *Moderate*		Sangat Membantu *Very Helpful*

Komen / *Comments* _____

10. Adakah anda berpuas hati dengan rekaan laman web berdasarkan ciri-ciri berikut: / *Do you satisfied with the us interface of the website based on those caharcteristics:*

3.1 Jenis tulisan / *Type of font:*

1	2	3	4	5
Langsung tidak *Never*		Sederhana *Moderate*		Sangat berpuas hati *Very satisfied*

Komen / *Comments* _____

3.2 Imej / *Image :*

1	2	3	4	5
Langsung tidak *Never*		Sederhana *Moderate*		Sangat berpuas hati *Very satisfied*

Komen / *Comments* _____

3.3 Warna / *Color* :

1	2	3	4	5
Langsung tidak *Never*		Sederhana *Moderate*		Sangat berpuas hati *Very satisfied*

Komen / *Comments* _____

3.4 Susunan isi / *Content arrangement (Eg: Navigation, tagboard, banner)*

1	2	3	4	5
Langsung tidak *Never*		Sederhana *Moderate*		Sangat berpuas hati *Very satisfied*

Komen / *Comments* _____

SEKSYEN C : **MAKLUM BALAS TENTANG SISTEM AGEN KHIDMAT PELANGGAN**
SECTION C : ***FEEDBACK REGARDING INTELLIGENT WEB BASED CUSTOMER SERVICE***

Arahan / *Instruction :*
Sila **tebalkan ('bold')** jawapan anda ./ *Please* ***bold*** *your answers.*

8. Adakah anda faham tentang penggunaan agen khidmat pelanggan daripada website ini? / *How much you understand about the agent from the website information?*

1	2	3	4	5
Langsung tidak *Never*		Sederhana *Moderate*		Sangat Faham *Very Understand*

Komen / *Comments* _____

9. Adakah anda berpuas hati dengan maklumat (maklum balas) yang deberikan oleh agen? / *Are you satisfied wi the information given by the agent?*

1	2	3	4	5
Langsung tidak *Never*		Sederhana *Moderate*		Sangat berpuas hati *Very satisfied*

Komen / *Comments* _____

10. Adakah anda berpuas hati dengan rekaan laman web bagi agen khidmat pelanggan? / *Are you satisfied with the interface of the agent ?*

1	2	3	4	5
Langsung tidak *Never*		Sederhana *Moderate*		Sangat berpuas hati *Very satisfied*

Komen / *Comments* _____

11. Adakah anda berpuas hati dengan tempoh masa untuk agen menjawab sebarang pertanyaan? / *Are you satisfied with the response time of the agent to answer your question?*

1	2	3	4	5
Langsung tidak *Never*		Sederhana *Moderate*		Sangat berpuas hati *Very satisfied*

Komen / *Comments* _____

Sila jawab soalan-soalan berikut bagi mendapatkan pendapat anda mengenai prototaip sistem khidmat pelanggan ini. Pendapat anda sangat dihargai.
Answer the following questions in order to gather opinions based on your experience using this prototype.Your opinion are really appreciated.

12. *Perkhidmatan khidmat pelanggan didalam e-bisnes memudahkan anda mencari informasi dan melakukan urusan jual-beli /intelligent web based customer service in e-business make it easier to find what information that you want and also do the trading process.*

1	2	3	4	5
Langsung tidak setuju *Strongly disagree*		Sederhana *Moderate*		Sangat setuju *Strongly agreee*

13. Adakah penting bagi anda khidmat pelanggan e-bisnes disediakan selepas manggunakan prototaip ini? / *How important is it to you that intelligent Web based customer service in e-business after you experienced this prototype?*

1	2	3	4	5
Langsung tidak penting *Not important at all*		Sederhana *Moderate*		Sangat penting *Extremely important*

Soalan kajiselidik tamat. Terima kasih atas kerjasama yang diberikan
End of questionnaire. Thank you very much or your cooperation.

Appendix 3.0.5.b Test cases for UAT

	Question / statement	answer	Satisfied? (Y / N) Comments ?
1	can i have your phone no		
2	which is the cheapest?		
3	which can i buy the phone?		
4	where can i buy the phone?		
5	where is your shop?		
6	where do you live?		
7	what is your shop		
8	how are you?		
9	where is the place		
10	what about the price?		
11	where can i buy those handphone?		
12	what else you can help me?		
13	Sara, how old are you?		
14	would you marry me?		
15	how are you sara?		
16	are you hungry?		
17	hey! I need phone. can you help me?		
18	may be handphone?		
19	which is the cheapest handphone?		
20	what is this?		
21	hello		