CHAPTER 1

INTRODUCTION

1.0 Background

Nowadays, a technical support service plays a main role in a University's ability to assist their students , staff and lecturers who really need some information and technical support guides. In the meanwhile , Educational institutions face the challenge of providing technical support to faculty, staff, and students for answering their questions and responding to their inquiries and problems with a suitable solutions and within a convenient time. (Cruess, 2002 and Niedzwiecki & Peterson, 2002). Moreover, The main goal of customer service is to provide better overall service to the customer when they contact the customer service employees, either through email, or a phone call. We want to make sure that everyone is satisfied with the first answer they receive with a correct solution in a timely manner. We want to be proactive and resolve as many issues as we can before the customer even notices that something may have gone wrong. The customer should notice an improvement in the turnaround time when a help request is submitted, as well as a reduction in the number of times they have to ask for help until he/she gets the solution. (Schauer & Thompson, 2004).

This proposed study will make an enhancement in the current technical support mechanism used by the UUM Postgraduate technical support department. It will be conducted based on Problem Tracking Technique which help to ensure consistent and quality support, track the information and problems that come into the Help Desk and assign or forward the problems to the appropriate workgroup and follow-up to make sure the problems were corrected.

Problem statement

Previously, by using the traditional help desk tools, the web interface was just a simple interface with an engine for generating an e-mail to our support staff. When an e-mail is sent to the 'example@UUM.com' for example, different staff will receive it. This sometimes resulted in duplication of work since multiple people could work on the same ticket or email, or no one would handle it since some groups would assume other groups or individuals would be handling a certain email. There was no standard and organized process for handling the users' requests. Sometimes no one responded right away and other times multiple people did, showing that we were not very coordinated. The same thing happens when using a traditional phone call as a tool of communicating with the customer service (Schauer & Thompson, 2004). Also Recently, there have been increasing number of interactions between users and customer service employees online. Therefore employees must take great deal of time to process inquiries from customers through the Internet (Iwai, Iida, Akiyoshi & Komoda, 2010).

In this research we are going to concentrate on the UUM Postgraduate CAS department to be as a domain of our study. In the meanwhile, students, staff and lecturers at UUM Postgraduate CAS department have always been able to submit problem reports via e-mail, or by phone. That is still true, but the question is : How effective is the use of these tools? In fact , The current campus help desk has become the "hub" of support with the many "spokes" of user services centered on it (Cruess, 2002). Students, staff and lectures do not have to be waited and passed on from one technical support employee to another until they get the answer of their problem or inquiry. In addition, once the student sends his/her problem to the help desk department by email , it will take long time until it gets solved. Because the ticket will not send immediately to the proper person that he/she is aware of the problem that has already been sent .In this case, the number of times that they have to ask for help will increase .

As a consequence, and based on the points that we mentioned previously, we proposed a web-based help desk system that can be used as a bridge between the users (students, staff, lecturer) and the technical support employee at UUM Postgraduate CAS department. In order to provide consistent and quality support to the students, staff and lecturers. In the proposed system we are going to use a problem tracking technique to track the information and problems that come from the customers into the Help Desk. In addition, assign or forward the problems to the appropriate workgroup and make sure that the problems are solved.

Research Questions

Based on the problem statement mentioned before, the following questions are constructed:

* What are the Limitations of the current UUM Postgraduate CAS help desk system?
* What are the techniques that we are going to use during the developing stage of the prototype of Postgraduate UUM help desk system?
* How can we evaluate the effectiveness of the proposed system?

Research Objectives

The main objective of this study is to enhance the current technical support of UUM Postgraduate department by developing an organized and significant web-based technical support system based on a problem tracking technique. In order To achieve this main objective, some sub-objectives can be formulated:

* To identify limitations of the current help desk system.
* To design and develop a prototype web-based help desk system based on problem tracking technique.
* To evaluate the prototype web-based help desk system based on problem tracking technique among the users.

Significance of the study

The proposed model will provide a significant and flexible way of communicating between the customer service at UUM and their users. Here are some significant and beneficial achievements that the proposed system is expected to provide:

The system can assist the students in postgraduate department to find the solutions for routine questions through FAQ part and manage its requests by using problem tracking technique.

The system will help the university to build a strong relationship with their students.

Increase the productivity of the employees at work and provide faster and more convenient services to their students, staff or lecturers.

All the users' requests will directly send to the proper department of the customer service for finding a solution instead of sending all requests to one customer service department and then this department will try to find the suitable person who can answer the incoming request, and here we waste the time.

Thus, we expect from this system to enhance the previous customer services tools and make it more effective and organized.

Scope and limitation of the study

This study will focus on developing a web-based help desk system using a problem tracking technique for Postgraduate UUM-CAS department at UUM. This system will let users (staff, students or lecturers) to freely interact with the technical support employees who have the ability to answer all problems related to the postgraduate services provided by the UUM-CAS. In addition, UUM-CAS postgraduate students can navigate FAQ section which contains a groups of frequently asked questions that are related to UUM-CAS Postgraduate department at UUM and they can find their problem or inquiry there. Moreover, the proposed system will help the students, lecturers, and staff at UUM-CAS postgraduate department to see the latest UUM-CAS postgraduate news and articles added by the technical support employees. The prototype to be developed is based on problem tracking technique.

Organization Of The Report

This report consists of six chapters which will cover the designing and the developing online help desk system for UUM-CAS postgraduate department at UUM. Here is an overview of the content of each presented chapter:

* Chapter One: this chapter introduces the problem, gives an overview about the study and describes the needs of help desk systems in the educational sectors. This chapter also discusses the scope of the study, the significance of the study and its objectives.
* Chapter Two: this chapter covers the literature review which is the previous related works that been done before. Moreover, this chapter represents relevant information for understanding the study more.
* Chapter Three: this chapter explains the details of the selected methodology that we are going to use in the project.
* Chapter Four: this chapter discusses about the prototype development and the implementation of the online help desk system for UUM-CAS postgraduate department at UUM.
* Chapter Five: this chapter discusses the evaluation process of the proposed help desk system.
* Chapter Six: this chapter discusses the conclusion, recommendations and future works to improve this study.

CHAPTER TWO

LITERATURE REVIEW

Introduction

This chapter discusses the relevant help desk researches that had been done before by researchers. Moreover, this chapter presents the current techniques used by UUM-CAS technical support department also it presents the techniques that we are going to use in the proposed study including problem tracking technique. In addition , it discusses the previous researches that had been done before using this techniques.

Definition of Online Help Desk System

Online Helpdesk as defined by Donna Knapp in a Guide to Customer Service Skill and Helpdesk Professional is a "single point of contact within a company for managing customers problem and request and providing solution oriented support services" (Knapp, 2009). Online help desk is also define a Help Desk as a formal organization that provides support functions to users of the company's product, services, or technology (Wooten, 2001). Another definition has been defined by Albin who said "Technical support is a service. It's about assisting pertaining to technology, especially regarding computers. It is also has to do with providing acceptable, effective and efficient resolutions"(Albin, 2002). As a consequence, Helpdesk is usually known as a department within a company that responds to user's technical questions or inquires.

Background of Online Help Desk

Often the term Helpdesk is used for internal support within the organization or for external support groups. Educational Institutions need to provide high quality of customer service and support to respond to the user's inquires and problems within a convenient time . A well designed Help Desk product should have the ability for the support customer to be part of the solution by offering a searchable knowledge base of common support issues and questions and a way for customers/users to easily create their own support tickets. With a web based interface, most users are able to navigate simple web forms with fairly high success rates to submit a trouble ticket or find answers to frequently asked questions or common problems. The helpdesk is responsible for bringing an organization's resources together in order to provide its customers with quality support and service (Czengel, 2001 and Vanderlip, 2004). Thus, to be able to choose the right techniques and to use them effectively in the help desk system, you have to understand what customers want. Knowing this will help you make sense of the techniques you'll be looking at (Bacal, 2005).

Benefits of Online Help Desk System

Web-based support offers an extremely wide variety of benefits. These will vary depending on factors such as the generation of the support site, the tools employed, the profile of the customer base, the services offered, and so on. Benefits typically originate from two aspects of support:

* Self-service
* Single source access

The benefits of self-service

On a Web-based support site, self-service refers to all information, functions, and services that customers can take advantage of on their own, without having to contact a support representative. Users might view or download information or seminars, search for solutions in a knowledge base, download a software upgrade, or check on the progress of their support log. The primary benefit of self-service is the ability to offer customers some form of support 24 hours a day, seven days a week. These extended hours of support come at no additional cost. The self-service functions you offer on your site would be available around the clock. Another significant benefit of self-service is the reduction in calls to the staffed support area. This means the more calls you are able to divert from your support area to your Web-based support site, the more benefits you will gain. This can achieved by specifying FAQ part in the system which contains the most frequently asked questions which eat up most of technical support employees time (Czengel, 2001).

The Benefits of Single Source Access

A Web-based support site that contains documents such as Knowledge base, FAQs, News, and so onâ€¦This documents will provide users with a single source access to the service provided by the institute or the organization. Implementing Online Helpdesk System, management can have a single point of contact with the users and resolve their problems (Czengel, 2001).

In addition to the two benefits that we have mentioned before there are some other important benefits of using Online Helpdesk Systems and they are as follows:

Improved help desk service quality as all inquiries or problems are immediately taken action timely identification, diagnosis and resolution of problem Improved user or customer satisfaction.

Providing existing users or customers with knowledge and FAQ's (Frequently Asked Questions) concerning the educational institution's services.

24-hour availability which means that the system is available always to receive the problems or inquiries from the users at any time and in any day.

Troubleshooting features gives users or customers the ability to solve many support problems on their own.

This tool provides the users or customer with an easy way of connecting with the technical support employees and within a convenient time.

Serves as a tool for tracking and recording helpdesk inquiries, which provides a knowledge base of resolutions to previous calls concerning similar issues.

The Potential Pitfalls of Web-based Support

The potential pitfalls in Web-based support come from poor planning and implementation. A site that offers little actual value to the customers or users, no matter how visually perfect it is, is worthless. Sites that are difficult to navigate, that contain out-of-date information, that do not offer help for the most common problems, that are designed at too advanced or too simple a level for the customer base they support all fall into the worthless category. You can spend a fortune on support tools, but if you haven't done a thorough job in planning and implementation, your support site will fail and you will get no payback on what you invested. Customers/users will go to alternatives such as telephone support, and getting them back to the Internet would be difficult (Czengel, 2001).

Web-Based Application

Web application known as an online communication services that client can access through their computer or handheld devices, this communication can be optimized via network support such as the Internet or an intranet (Grove, 2009).

Problem Tracking Technique

There are many researches had been done before using a Problem Tracking Technique. This technique had been used in order to improve the efficiency of using help desk systems by the users. One of the research that had been already done is a help desk system that had proposed for The Information Technology Services Department in North Dakota State University . The system allows them to track problems by assigned person, assigned group, for a specific user and many other ways. They can generate "ad hoc" reports to analyze problems that have occurred over a set period of time or by department as needed. Thus, For a help desk to be effective and efficient, it needs to have a proper set of tools. These tools are used to manage the incoming calls, monitor servers and network connections, track problems as they enter the help desk and are transferred to other support units, being able to view the end users screen, documentation, training and many others.

User Part

Once the user did not find the solution of his /her problem in the FAQ part, he/she is going to use the ticketing system which is one of the system functionality. The user will create a new ticket and include his/her inquiry or problem within this ticket. The process of creating new ticket includes several steps. At the beginning the customers must choose the section that the faced problem belongs to. For example students fees section or registration section. After that, the customer will enter his/her personal information and he can specify a priority to his/her ticket for example urgent or normal .The customer can attach a file with his/her ticket in order to explain his/her problem more (Edwards, 2010 and Kayako, 2009).

Technical support employees part

After the user completes the process of sending his/her ticket to the suitable group of the technical support employees, here comes the role of technical support employees to respond to this ticket .Each ticket has a status which can be Open, Waiting for reply or Closed .Once the user creates his/her new ticket and sends it to the technical support employees, the status of his/her ticket will be automatically Open since it is a new ticket. That's mean it needs a reply from the technical support employees. After one of the technical support employees replies this ticket, he/she will change the status of this ticket to be Waiting for reply which means the ticket has been replied by the suitable technical support employee and it's status now is Waiting the user to send another reply if the first answer that he/she already got is not clear enough. Suppose that the customer needs more explanation or more details about his/her problem, then after he/she got the reply from the customer service, the user can change the status of this ticket from Waiting for reply to be Open and send it again with his/her new inquiry to the customer service employees. The status of the ticket will automatically become closed after a period of time called DUE which is specified by the administrator of the system and it is defined as the maximum time that the ticket will be remained in case of waiting for a response from the user. That means after the expiration of this time, the status of the ticket will be closed. After this time called DUE the ticket will be closed and it will become as a read-only ticket from the side of users. In other words, the problem has been solved and does not need any reply anymore. The last thing that we want to indicate that imagine that a user has sent a ticket to the technical support employees through the system and let's answer this question: what will happen if the ticket still in the queue of the ticket's queue without any answers from any technical support employee? In fact this case is the worst case that it might make the user in the status of waiting for reply through unlimited time. In order to handle this problem, In the proposed system there is a part for administrators which enable the help desk managers or administrators to monitor and manage the process of ticketing system. They can view the tickets that no one has answer it and assign it to the suitable technical support employee. (Edwards, 2010; Schauer & Thompson, 2004; and Kayako, 2009).

Building up FAQ

Building up FAQ is also an important task of help desk. The purpose of building up the FAQ is to reduce the number of inquiries that come from users. Users can browse the FAQ pages and clear up their unfamiliar matters before they send emails or tickets to the help desk employees. Help desk employees also can analyze inquiry records, construct questions and add them to the FAQ part. For example, if the help desk employees see that there are questions that come out from users several times, then they can simply organize these questions by added them to the proper group of FAQ section so the users can find it there before they send a new question which is already exists at FAQ section (Iwai, Iida, Akiyoshi & Komoda, 2010 and Kayako, 2009).

UUM-CAS help desk mechanisms

In the meanwhile, the current technical support mechanisms used by UUM-CAS postgraduate technical support department are still limited to phone call and email as a way of communicating between users and the technical support employees. Generally, the disadvantages of using this current techniques are divided into two parts based on email or phone call. The first part of disadvantages are the problems of using phone call as a tool of providing the technical support service. The first problem of using the phone call is that the technical support employees are not always the same who answer the phone. Which means, every time you talk to different technical support employee, you should explain your problem again and again until you get the solution of your problem. The second issue of using a phone call is the wasted time that the user should wait since he/she may pass on from one technical support employee to another until he/she gets the answer of his/her problem or inquiry. The third issue appears during the registration time while the pressure on the technical support center is more comparison to other time and especially on using phone call. At that time, the user should wait on the phone until he/she can talk to the customer service employees since the phone is busy. From the other side, there are some issues comes from using the email as a way of interacting between the users and the customer service employees. First of all, it takes long time from the customer service employees side until they solve the issues since the problem will not be received from the proper technical support employee who has an infrastructure about the problem that had been sent by the users. The second thing is multiple people could work on the same email or no one would handle it since some customer service employees will assume that other employees would handle it. Thus, and as we can see there is no standard and organized way of handling with the user's inquiries and problems.

Chapter Summary

The analysis of literature review had broadened the scope of Online Helpdesk issues. The information and findings collected form this chapter is used as a guidance to develop the Online Helpdesk system. By reviewing the UUM-CAS postgraduate help desk case study, we can conclude that helpdesk system plays an important role in the educational institutions. This chapter has also demonstrated the importance of helpdesk system in the context of UUM-CAS postgraduate help desk department.

CHAPTER 3

RESEARCH METHODOLOGY

Introduction

This chapter discusses the adopted methodology which applied to achieve the objectives of the study in designing and developing the proposed web-based help desk system for UUM-CAS help desk department.

Research Methodology

Research methodology plays a very important role to proceed and carry out with the whole all research study. Moreover, it is very important to choose the suitable methodology for your study in order to achieve the objectives of the study. In general, a lot of studies that had been done before use the research methodology to achieve many purposes such as gathering data and information, development and evaluation (Refsdal, 2008 & Schmuller, 2002). Besides that, Research methodology step makes us fully awareness about the requirements of our study and the problem statement of the research. Thus, The methodology of this research the we are going to apply is based on the five general research steps that are proposed by Vaishnavi & Kuechler. These steps includes the awareness of problems, suggestions, development, evaluation, and the conclusion of the research as they are illustrated in the Figure 3.1.

The awareness of problems

In this step, some important information had been gathered about the current problems and limitations of using the current traditional help desk mechanisms at UUM-CAS help desk department. This can be achieved by interviewing the students, lectures, and staff to see what are the disadvantages of using the current customer service in order to overcome it. Moreover, we can use some beneficial instruments such as questionnaire. In addition, we can collect some information from some related work that had been done before by other researchers. Thus, This step aims to identify the problems and come out with a significant and more organized solution.

Suggestions

The second step of the methodology of this research is to suggest building a web-based application based on problem tracking technique in order to enhance the current technical support tools used by UUM-CAS help desk department. In this phase, some flow charts and some Unified Modeling Language (UML) diagrams will be used to design the proposed prototype. The Figure 3.2 illustrates briefly the technical support operation of the proposed system:

Figure 3.2: Diagram explains the proposed system

- Design Pattern

"Design patterns describe how objects communicate without become entangled in each other's data models and methods. Keeping this separation has always been an objective of good OO programming, and if you have been trying to keep objects minding their own business, you are probably using some of the common design patterns already (Cooper, 2002).

- Why Design Pattern?

Why do we need to use design pattern? Nowadays computers' programs is becoming more complicated, for this reason it is important to have a way of making building software easier and less complexity. For example, SQL Server and Oracle are become the most common databases used in the meanwhile . Let's imagine that we are working in a software company and we already developed a costly system using SQL Server database and because of a certain reason the company wants to change its database server into Oracle. Does that mean we want to ignore everything has been built and start building our new system from scratch? The answer is no of course. By using a design pattern we will be able to build a system which rebuilding ability exists. As a result, we just need to change the part of code which deals with SQL Server with Oracle one. Design pattern has divided the system into layer each layer has its own job starting from the View layer and ending with the database layer and the figure 3.4 below is really express what i just mentioned.

If we ignore using design pattern in our system , then our system simply will miss the usability technique. As the figure 3.5 shows that we should not ignore the Business tier and dealing directly with the data tier if we do so then it is hard to make changes in the application. Thus, In this case and if we want to change in one place, then we should change in many other places that are related to the change instead of make the changes in one place by using the organized design patterns.

To explain how does the design pattern technique work, let's take the following scenario : Once the system has started, it will collect some configurations from configuration file about the connection string of the database and the name of Business Logic Layer DLL (BLL). That means the connection with the database will not establish until the business layer successfully retrieved the configuration from the configuration file. Business Logic Layer is responsible for retrieves data from the data layer, so the business logic layer plays the role of mediator between presentation layer and database layer. IDAL (Interface Data Access Layer) is an interface that we just need to deal with it regardless the type of database that the system works with.

- Hardware Requirements Of The System

Since the proposed system is a web-based application, so to run the system on the web environment we need a web application server that can handle the requests that come from the users of the proposed help desk system. In addition to the web server, To run the system on the web server, it has to have the minimum hardware characteristics that enable the web server from installing dot net features such as dot net framework which is necessary to run the application on the web server smoothly and successfully.

- Software Requirements Of The System

As we mentioned in the hardware requirements of the system, we need to install the dot net framework on the web server since the developing environment of the proposed system is Microsoft Visual Studio and this framework is necessary to run the application successfully on the server. Besides that, a web browser application is necessary to be installed which is the middle tool that will make the connection with the system application which is running on the server side.

- User Requirements Of The System

Generally, The user of the proposed system is divided into three categories. That is, UUM users (student and lecturer), technical support employee, and administrator. Each group of the system has its role based on its authority of using the system. Since the proposed system consists of three parts ( User, Technical support employee, Administrator) , each group of the users can use the suitable part based on their authority. UUM users can use the user part of the system to submit the problems as a tickets to the customer service employees. In addition, they can see the latest news and articles added by the customer service employees and download the files that are related to UUM-CAS. While the technical support employees are responsible to respond to the tickets that come from the user part, in addition to manage the articles, news and download sections in the user part. The last part is the administrator which is responsible to manage the technical support part throw adding new group in addition to manage the technical support employees.

Development

A software development process is a process to build a software product or to enhance an existing one. Moreover, the Development stage of the research methodology is the most significant stage in our study since it represents the answer of the problem statement also it represents the main objective of this study (Hoffer, J. et al., 2002 & Liu, 2002). Generally, system development process consists of the three distinct phases that follow each other smoothly Analysis, Construction, and Testing. Each phase of development proceeds in strict order, without any interfering or repetition steps. Thus, we are going to demonstrate each phase more later.

Analysis

The purpose of the requirement capture analysis is to aim the development toward the right system. Its goal is to produce a document called requirement specification. Moreover, the requirement specification is the official statement of what is required of the system to be developed. It must state what to be done rather than how it is done. It must be in a form which can be taken as the starting point for the software development. A specification language is often used in this stage to translate the user requirements in a form that is beneficial to use in the next stage. Graphical notations such as Unified Modeling Language (UML) is often also used to describe the requirement specification which is a good approach to formalize of the system analysis and design in order to use it in the next stage which is the Construction stage (Lui, 2002).

Construction

Software design is realized as a set of programs or programs unit. Each module from the entire system is tested during this stage. The modules will be a combination, which makes up to the Online Helpdesk System. This phase will ensure that all modules, which will be developed for the online helpdesk system meet the system specifications. Primarily, this stage consists of design and implementation. The implementation part should be completed by adopting the developing language which is C# and for constructing the database we use SQLSERVER to be as a data storage. In addition, we are going to use Design pattern for better structure of the application. The representation of the help desk system is the prototype which will be able to display what are the functions of the proposed system. The specific characteristic of the prototype is that it can play as the role of mediator of the communication between the developer and customer. It is much easier to express a view about something that can demonstrated and used (Ivar et al., 1993).

Testing

In this phase, each individual module that are developed for the online helpdesk system will be tested as a complete system to ensure that the system meets the software requirement. From another side, By taking advantage of software design principles and patterns, we can build software that is more resilient to change. Since we want to make our application more change proof on a more granular level, then we can build unit tests for our application. A unit test enables us to verify whether a particular method in the application works as we intend it to work. There are many benefits that result from writing unit tests for the code Building tests for the code provides a safety net for change. Moreover, it forces us to write loosely coupled code. When your application code is covered by unit tests, you can modify the code without the fear that the modifications will break the functionality of the code. Testable code tends to be loosely coupled code. To build your application so that it is testable, you need to build the application in such a way that it has isolatable components. One class is loosely coupled to a second class when you can change the first class without changing the second class. Finally, writing unit tests forces you to take a user's perspective on the code. When writing a unit test, you take on the same perspective as a developer who will use your code in the future. Because writing tests forces you to think about how a developer will use your code, the code tends to be better designed (Walther, 2010). As we are going to use Microsoft Visual Studio 2008 in building the system, it enables us to build a unit test that help us to verify the code and see if it works as we intend it to work or not.

Evaluation

In this step, and after we have finished the development step, we are going to do some evaluation on the results that we have got to make sure that the results satisfy the research objectives. In more details, we are going to see whether the users of the system are satisfied while using this system, what are the enhancements that the system provides compared to the previous technical support mechanisms that had been used? Is it effective and easy to use by the users? Thus, in order to get the answers about all this questions and do the evaluation successfully, we are going to use a set of questionnaire as an instrument to achieve beneficial evaluation to which we aspire.

Conclusion

This step includes the results that are going to be achieved after completing the study. In addition, A future work can be included in this section.

Summary

As a summary, this chapter has discussed the project methodology used to develop the Web-based Helpdesk system for UUM-CAS helpdesk department. This chapter also has described in depth the general research steps that are proposed by Vaishnavi and Kuechler.