

An Online Help Desk System to Help Students in Learning

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Abstract— This paper reports about a field study done on online helpdesk system for General Sir John Kotelawala Defence University (KDU) and about the system prototype which was built according to the analysis of gathered data. When considering the current learning process prevailing at KDU, when participating in lectures, students do not get a chance to present their problems to the lecturers very often. Therefore, we address the problem of not having an opportunity for the students, to solve their problems that arise during the lectures. To overcome this problem, a Web Based Help Desk System was introduced for KDU. Through this Online Help Desk System, students will get the opportunity to present their problems to the relevant lecturers, whenever they need a further clarification on any subject material. Students are facilitated by the option to choose the priority level of a question. So, unlike other help desk systems, this system will ensure that each question posted on the system will be answered as soon as possible according to the priority level preferred by the student, by notifying the lecturers by an email. The accuracy of the provided answers will be assured since, only the authorized lecturers of KDU have the eligibility to get registered to the system as an answer provider. When developing this Online Help Desk System, the focus was given to build a system, which will give more time critical and task sensitive online help.

Keywords—Online Help Desk System, Question and Answer System, Web Based Application

I. INTRODUCTION

A. Prolegomena

In the modern world with the development of technology in the area of learning, e – learning has gain a prominent place. Among them, more attraction has been drawn towards Online Help Desk Systems. This can also be known as Online Question and Answer Systems. Online help desk systems can bridge the gap between the user’s need for simplicity and the software’s complexity, by providing relevant information within the very specific context of a user’s lack of familiarity with a particular concept. This is a common definition about the online help desk systems.

When talking about help desk systems, at once the idea that comes up to our mind is the help desk system

that is available in every software and systems. Those help desk systems will provide solutions for the problems regarding the usage of system and services rendered by the systems. However, in this research, the main concern was drawn towards the implementation of an online help desk system in an educational context. That means this system will help the students to solve their problems that arise during their lectures regarding subject matters. Therefore, with the help of this system, students will get the opportunity to clarify their doubts regarding the subject matters whenever they need.

B. Background and Motivation

Online Help Desk System is a research area that has recently gained a lot of interest. A large number of universities and researchers have done research on this topic. At the early stages of this research area, more attention has been given to develop this system only concerning the system point of view. But Ye Chen, a PhD student in the Department of Information Systems at University of Maryland has done a research on developing a Help Desk System concerning also the organizational factors and human behavioural factors and not only the designing perspective. In his research he argues that organizational and human behavioural factors are also important and should take into consideration to provide the most appropriate service according to what actually the users expect from online help desk system. Also he has done this research on a context of an educational institute. (Chen, 2004a) This was the main motivation factor which lead to do this research.

C. Problem in Brief

The Department of IT in KDU Rathmalana offers two degrees. They are the BSc in Information Systems and BSc in Information Technology. Currently the Department of IT has three intakes with more than 100 students. Initially the team has built this system for the students of all three intakes who are reading for the BSc in Information Technology Degree.

In each intake, there are a considerable number of students. Each day the students will have two lecture sessions, from 8.00 am to 2.15 pm. One lecture session will be three hours long. When the lecturers are conducting the lectures, the students will get many

problems regarding the particular subject. Due to the lack of time and since there is a substantial number of students for a single lecture session, all the students might not get a chance to present their problems to the lecturer. Sometimes some students hesitate to present their problems to the lecturers in person because they are shy or less confident. Moreover, because of the busy schedules of the lecturers, the students will not be able to meet the lecturers even after the lecture hours to get solutions for their questions. Also, while the students engage in their further studying at home they might get doubts. But they will not have an opportunity to solve those doubts even by surfing the internet, since the accuracy of the answers that can be gained by various other websites cannot be assured. These are the main problems that the students face when they engage in their studies.

To address the above mentioned problems the team built a Help Desk System which will be fully web based and automated. Therefore, the students will be able to present their problems to the lecturers from anywhere anytime and also the lecturers will be able to provide answers for those questions from anywhere, anytime. Simply, this system is a platform which connects the students and the lecturers, for the benefit of the students.

The objectives that were expected to achieve by doing this research were, to conduct a critical review on technologies used in currently available Online Helpdesk Systems and to design and develop an Online Helpdesk System for the students of the IT Department of KDU, which will be beneficial to encourage the students to engage in their studies without doubts and with more clarifications and understanding, as well as to increase the interest in learning.

II. LITERATURE REVIEW

A. Introduction

In this section, we critically review the research conducted in web based helpdesk systems. This review has organized in three sections namely early developments, recent advancements and future direction. Finally, this section presents the research problem and the technology that need to be adopt to solve the problem.

B. Early Developments

A help desk system can be described as "The process of handling unstructured data in a structured manner". As stated by Gyll and Gyll (Gyll and Gyll, 2003) a general definition of a help desk system is, to be able to create a stable environment where it is easy to make decisions and find solutions to problems. Help Desk Systems has developed in order to help the organizations to effectively communicate, organize, track and report issues. The importance of web based help desk systems is that the

organizations can access information at anytime and anywhere(Hafifi and Ariza, 2012).

A technical definition of a help desk system is, it is a collection of one or more programs designed to provide user assistance embedded in a larger program or computer system. Although designers frequently integrated help programs with the application, help systems might also be separate and run concurrently with the system (Chen, 2004b). The issue in this definition is its narrow scope due to its application-oriented nature.

Along with the prevalence of a diverse and heterogeneous range of software and hardware systems, an online help system serves as a gateway to all kinds of computing resources. With the massive development of technology, online help systems are also developed largely. The evolution of help systems has come from book oriented to constructive through exploratory. Book oriented online help represented paper-based documentation, which highlighted static and linear structure. Although this traditional organization of contents was familiar to users, the limitation of this approach was, not quite capable for satisfying the complicated information needs of particular users in specific contexts for distinctive tasks. Due to this it paved the way for hypertext-based online help, either exploratory or constructive. The significance of exploratory online help was that it provided multiple paths to navigate a document thus increasing the interactivity. Its flaws were unfamiliarity to users and difficulty to read through. Constructive online help allowed customization by users, feedback to developers, and capability to re-conceptualize tasks. This online help conception evolved along the dimension of user-document interactivity(Chen, 2004c).

Due to these reasons, it is clear that online help systems should be considered in an organizational context rather than from an application-oriented context.

According to Sondheimer and Relles (1982) online help systems are categorized into four dimensions,

- (1) Access method - How users input help requests.
- (2) Data structure - How the help information is organized.
- (3) Software architecture - How users and the help systems interact.
- (4) Contextual knowledge - To which extent the help information is relevant to the environment and the tasks of a specific user.

But this categorization had some drawbacks. Bergman and Keene-Moore (1985) argued that one shortcoming of this categorization was that these dimensions only took into consideration software related aspects, omitting user interface related factors.(Moré et al., 2012)

C. Recent Advancements

In the recent advancements of online help systems educational institutions has started to incorporate this help system with e learning by integrating them as question and answering systems.

Universities or higher education institutions have started introducing the open source software and practical experiences have been reported by them in various scientific journals. Introductory examples of e-Learning and their effectiveness have been reported. Construction and application of an e-Learning environment are often based on open source packages, such as Moodle, Stack Overflow, Yahoo!Answers, wikiAnswers etc... (Brill et al., 2002)

Since e-Learning offers a learning environment which exceeds spatial and time-based restrictions due to the use of web technologies, its usage has been continuously increasing every year (Lebedeva and Zaitseva, 2014). All information systems built for the purpose of educational support are summarized under the term "e-Learning". Installation and operation of an e-Learning environment are already playing an important role in educational facilities, such as universities and anyone can install an e-Learning system without much effort. (Moré et al., 2012)

Although many e-Learning/question and answer systems have been implemented by Universities around the world, these types of systems are not being implemented in Sri Lankan Universities. This helpdesk system which is to be implemented have new options such as, notifying the relevant lecturers according to the relevant categories and also an option where an e-mail is to be sent to the lecturer if a student submits an urgent question which we do not frequently come up with other e-Learning systems. This is the novelty of this system.

D. Future Trends

The future trends of e – learning systems include intelligent question answering systems. QA systems have developed over the past few decades until they reached the structure that we have nowadays. QA systems, have a backbone composed of three main parts namely question classification, information retrieval, and answer extraction. Therefore, each of these three components attracted the attention of QA researchers (Allam and Haggag, 2012).

The main challenge that is faced by the future help desk systems is that how to make it flexible with the changing technology and thereby provide customers with a comfortable and reliable customer support which is based on customer centric approach. The solution for this challenge is implementing them in a way such that they will accompany the changes as well as the growth of technology (Barskar et al., 2012) (Fukumoto et al., 2013).

The fast rise of information technology, mobility of users, and security as well as compliance regulations are affecting the future of help desk more than ever. In this regard, help desk software programs are viewed to progress towards an operationally focused management that gives primary importance on the main competencies of customer care. With customers getting bolder and

technology-savvier, improving in this regard is seen as necessary. (Ómarsson, 2010)

Changes in technologies are driving many changes in the help desk. Better help desk software functionalities are viewed to possibly modify, if not entirely revolutionize, the future of customer support by focusing more on strategic solutions and higher-level problems.

When creating the correct help desk solution, it is important to pay attention to the communication flow between a business and IT.

Therefore, the IT help desk shifts from being a preemptive strategy to an important strategic function of a business that provides essential business value and have a dynamic part in assuring a company's success not only at present but also beyond. (Mishra and Jain, 2016)

Therefore, the identified problem from the literature review is that developing a helpdesk system, which is organization oriented and which is cable of coping with the changing and growing technological advancements.

III. METHODOLOGY AND EXPERIMENTAL DESIGN

A. Data Gathering

Combination of qualitative and quantitative methodologies were used as data gathering techniques when designing the requirement specification. Questionnaires and interviews were the main data gathering methods that were used to gather the requirements and the information. Apart from that, observations were also used. All the required data were collected by using a selected group of personnel within an exact period of time. Interviews were conducted with both the lecturers and the students. And the questionnaires were used to gather the data from the students because, it is an efficient technique to gather data from a large audience. Face-to-face interviews were conducted with a selected group of lecturers who conduct lectures for all the three intakes, 5-10 students from each intake and with the Head of the Department. When conducting the observations, the team participated in a lecture and observed what really happen in a lecture and what the problems that the both parties face are. Although this method was a bit time consuming this was the most accurate method for data gathering because it helped to get the experience of the real situation.

B. Date Representation and Analysis

According to collected data, the team identified that most of the students were used to search their problems in Google and also they have stated that, since the answers available in various websites are different from each other, students find it difficult to get correct answers on the internet and it was time consuming. Some students

were used to call lecturers or meet them in person to ask questions. But, they also stated that, most of the time lectures were not available to answer the calls or meet students due to their busy schedules. Some students were used to ask from friends but there were problems in the accuracy of the answers which provided by friends. So the current process was time consuming and less efficient. The data gathered by using the above mentioned techniques were analyzed by using tables and charts.

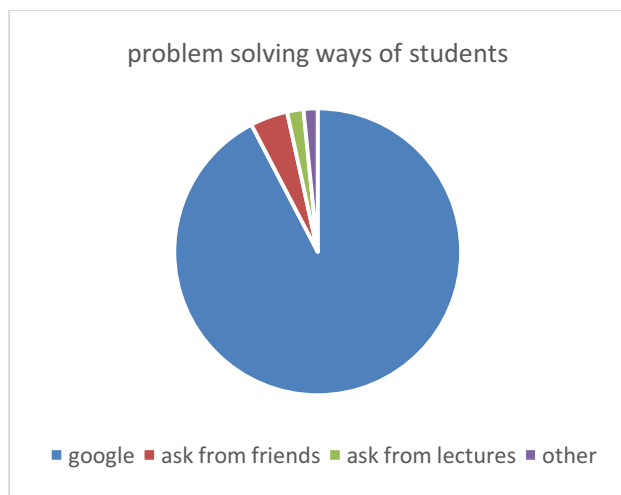


Figure 1. Data Representation

Through examining the data, the team were able to clearly identify the existing process, problems and limitations prevailing in the current process and the suggestions of lecturers and students regarding the existing process. Some of the identified limitations of the current process were due to various reasons such as, all the students don't get the opportunity to present their problems to the lecturers, inefficiency and time consumption. And through this analysis it was proven that the students and the lecturers were highly satisfied with the proposed system. Finally, after this analysis the team came to the conclusion, that a fully automated system should be developed to re-engineer the existing process to make it function better.

C. Approach

The main users of this system are the students and the lecturers. In addition, a system administrator can also access the system for registering users, maintenance, troubleshooting and upgrading. There are five major different types of inputs concerning students and lecturers. Students can logon to the system by entering username and password. Then they can post the question, the subject area which the question belongs and the priority of the question. Lecturers can also logon to the system by entering username and password. The outputs of the system are solutions for the problems submitted by

the students, ratings of the provided answers, feedbacks and e-mail notifications.

D. Technology adopted

The most appropriate technology for developing the system should be decided by considering the system domain and the requirements. It is much significant to select the technological methodologies which will be capable to satisfy both the functional and non-functional requirements of the system. Since the proposed Online IT Helpdesk system is a web based system the team had to pay more consideration when opting the technological facet. The technological methodologies had to be selected in such a manner that it will help the system to be available at anytime, anywhere and also to make it efficient and effective. With an in-depth analysis of the system requirements, PHP has been used as the main programming language to develop the backend of the system. The database of the system has been implemented using MySQL. The front end of the system has been developed using the programming languages HTML and CSS and also the bootstrap framework was used to make flexible and user friendly interfaces. Finally, the validations of the forms have been done using JavaScript.

E. Design

Design of the system is described under two topics as overall system architecture and modular architecture.

1) Overall System Architecture

This section will describe the three tier architecture of the system. The system as a whole is mainly divided into three layers as Client Layer, Application Layer and the Database Layer.

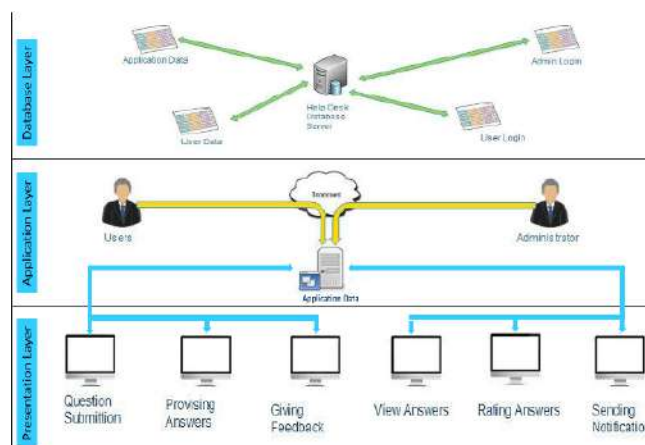


Figure 2. System Architecture

2) Client layer

This layer builds the interaction between the users and the system. Mainly in a system the human computer interaction is achieved through interfaces. Therefore, this is the layer which holds the interfaces created according to the user requirements. There is a variation of the

visibility of interfaces to the users. At the beginning all the users get the access to the same login interface. But after the user authentication the interfaces accessible for the users are different. This has been done according to the role which the users play in the system. The main function of this system is question submission and providing solutions. Therefore, the interfaces of the system has been designed to accomplish this task easily without any hesitation.

3) Application layer

This layer act as the bridge between the client and the database Layer. This layer will do the manipulation of processes according to the given inputs to present the expected output. Functionality, efficiency, accuracy and the productivity of the system is mainly based on the logic which is designed at the application layer.

4) Database layer

This is the layer which does the database management of the system. And also the data storing tactics are determined in this layer. In the new system there is only one database to store all the data regarding the system. The database is created in a very consistent manner also by applying the concurrency control. In the database all the tables are interconnected with each other properly to make the data manipulations effective and efficient. Both the data entered by the users and the data which is processed by the system are stored in the database.

5) Modular Architecture

This section discusses about how the system is divided into modules and how each module functions. The modularized approach used in designing has ease the development and the maintenance of the system.

6) Login and Authentication Module

Only the authenticated users get the access to the system. After the authentication the accessibility to the system varies according to the user type.

7) Question Submission Module

This module is only accessible by the students. Here the students will submit their question, prioritize the question as low, medium or high according to the time period that they need the answer and also they will select the subject area which the question belongs. Then the system automatically forwards the question to the lecturers who have expertise in the relevant subject area.

8) Solutions Providing Module

This module is only accessible to the lecturers. When a question is forwarded to the relevant lecturers then that lecturers provide the solution for that question. If all relevant lecturers refuse to answer a question within a

given period of time, then that question is forwarded to all the lecturers who have been registered in the system.

9) Notification Sending Module

If a student prioritizes a question as high, then that relevant lecturer is notified with an e-mail notification. And also if a question is prioritized as low and if that question is answered within a short period of time then students are notified with an e-mail notification.

10) Answers Rating Module

This module is only accessible by the students. When lecturers post the solutions students get the opportunity to rate those answers by giving stars.

11) Feedback Module

This module is accessible for both the lecturers and the students. Both users can give feedbacks about the system and the services rendered by the system.

12) Previous Question Viewing Module

Both the lecturers and students get the access to this module. This module provides the facility of viewing previous questions and the answers.

The developed Online IT Helpdesk system consists of three main interface categorizations, namely interfaces of administrators, interfaces of lecturers and interfaces of students. At the beginning, all three types of users, login to the system by using the same login interface and then the interfaces are visible according to the user type.

Following figures illustrates some of the main interfaces of the proposed solution.

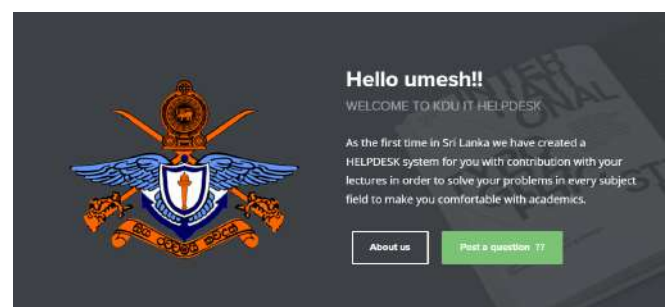


Figure 3. Welcome Page

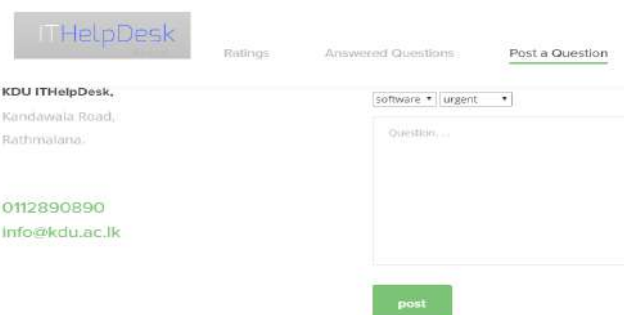


Figure 4. Posting a Question

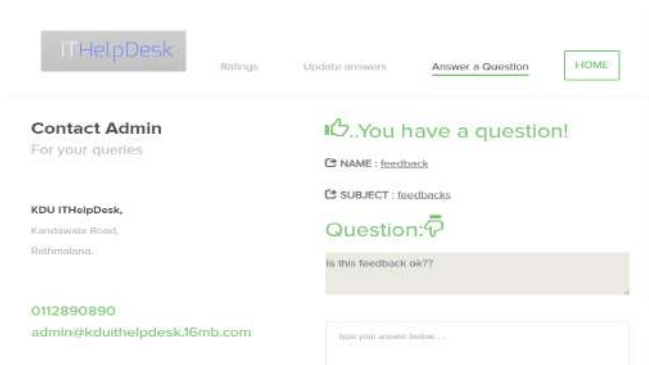


Figure 5. Answering a Question

IV. RESULTS AND DISCUSSION

An evaluation procedure has been carried out to check whether the system functions properly and whether it meets the expected requirement specifications. For this evaluation purpose a stable system prototype has been used. And it is of utmost importance that this prototype is very much similar to the final product. In the evaluation procedure questions were directly forwarded to the relevant lecturers as expected in the requirements. As an example when a user posted a software based question by selecting the software tag that question was only displayed to the lecturers who has software tag with an email notification. And when the answer is provided by the lecturer then a notification email was sent to the student who posted the specific question. The system was tested using dummy data and the accuracy of the system was 100%. All the mails and question forwarding was done without any errors.

After implementing the system lecturers were able to give comments regarding the answers provided by other lecturers and students were able to give feedbacks about the satisfaction of the given answers. And the lecturers were satisfied with the feedbacks given by the students. User interactivity with the system was 100% and the system helped the students in many ways, like they could ask the questions about their subject matters directly from their department lectures and thereby, they were able to get more reliable answers to clear their doubts. And also each and every student got the opportunity to present their problems to the lecturers. And they could look and search the questions which was asked by other students. When posting a question students' name was displayed along with the question and the lecturer name was displayed when a question is answered and comments were posted anonymously in order to avoid conflicts between lecturers. Therefore, students were motivated by the system to ask more questions. As a result of that students engaged in more studies and increased their academic knowledge. Finally, this system was accomplished in creating an online academic discussion among the lecturers and the students. When

considering the nature of this system it is clear that this system has a more dynamic nature. The system will have to process a number of user requests at once. Therefore, this system can be further developed by using the emerging multi-agent technology. This technology will be able to handle the dynamic nature of this system in a very reliable manner. Therefore, this can be done as a future enhancement for the system.

V. CONCLUSION

This online help desk system is a novel system which will be implemented in KDU because there is no such system currently available. This system is developed with the intention of helping the students to clear their doubts regarding the subject matters. The main motivation fact that lead us to develop such a system is that, due to the busy schedules of the lecturers and due to the large number of students, the opportunity to solve the problems regarding the subject matters is minimum. There are mainly two types of users who are directly beneficial with the system implementation. They are the lecturers and the students. Because with the help of this system, students will frequently get the opportunity to present their problems to the lecturers from anywhere anytime as this is an online system. And lecturers will get a clear view about the subject matters that they should be more attentive. According to the gathered data, it has become clear that both the students and the lecturers are completely satisfied with the system. Therefore, the entire project process concludes an efficient and accurate development of an online help desk system for KDU based on the collected data. This system is primarily developed for the IT department of KDU. As this system is scalable this can be further developed to cover all the faculties of KDU.

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