

A Web Based Knowledge Sharing System

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Abstract-Knowledge is a powerful acquisition in life, which gives the ability to make good use of information on hand, enabling to disseminate it accurately and use it wisely. Sharing knowledge is more important to build collective knowledge, to retain knowledge, to increase innovation and to stay abreast of changes. Although there are, knowledge sharing systems in use, web-based knowledge sharing systems came to the topic in the middle of the 19th century. Since there is no proper, web-based knowledge sharing system still in use with all required functionalities, some creative ideas are dispersed and some good innovations are wasted without any usage. Most importantly, it was understood that, the interactivity with rural area children and the interconnection between university children is very less. Due to poor facilities, they have lost many chances to share knowledge. In order to address above said problems a web based knowledge sharing system with all functionalities was developed including three main modules named server side module, client side module and the database. Two kind of users namely students, lecturers can create groups, share files and organize events by using this system after registering. Verifying users by NIC/University email and google map to indicate exact event places are the major key features in this system. To develop the user interface, the technologies such as ASP.NET web forms, JavaScript, and HTML together with CSS have been used. Database was created using MS SQL. User details, questions, answers, subject details, files are the system inputs while confirmation email, notification email, online quiz marks, Event details and downloaded files are the outputs. User validation, upload files, handle groups, upload questions and answer are the major processes available in this system. The prepared solution has been tested with at about 60 users by assessing the features such as user friendliness, responding speed, and user interactivity, maintenance of the system and usefulness of the application. The user feedback analysis shows that, this solution works according to the user requirements and in a proper manner.

Keywords—Knowledge sharing systems; Technology, Education, Database

I. INTRODUCTION

Nowadays People have understood the value of learning and education and everyone try to raise their knowledge in many ways, as Knowledge is both socially and individually important. Educational psychologists have identified that when students work together in collaborative teams, they learn material

better than when they study alone [2]. Community based education is a method to promote learning and social development work with individuals and groups. It helps to share knowledge and experience through communication. So that each individual can operate more effectively and can express their ideas freely. Community based learning provides easy way of discussing and communicating with other people, easy way of accessing shared data, exchanging learnt knowledge and learning materials with others [5]. Main advantage of community based learning is that this process expends the word “intelligent”. Because the learner can gain understanding, use knowledge, and solve problems, while developing a sense of self. Success is not only based on learning core academic subjects, but the improvement of both academic and extracurricular activities and as well as building relationships and interpersonal development [4]

Sharing knowledge depends on the habits, willingness, and commitments of the knowledge worker to find out and be receptive to these knowledge sources. It is all about linking people, ideas and organizations to enable information exchange and networking activities. By exchanging stories, problems and solutions this method can bring their collective knowledge to bear on individual problems [10]. The final solution was designed to build up a solution of creating an application by connecting all universities, students and lecturers/teachers in one place. A web-based knowledge sharing system application was implemented and designed which will be useful to everyone in upcoming days. Through this application Sharing and co-Learning about related practices across projects, learning while doing, Professional development, organizing events, sharing expertise knowledge among others, organize activities, Interconnection with different Universities/Institutes can be done.

II. RELATEDWORK

Even though Web Based Sharing Knowledge systems are important, less number of related wok could be found in the particular domain. Tom Preston-Werner together with Chris Wansstrath and PJ Heylt has described GitHub for open source coding projects using

Ruby as the main technology[7]. Inability of managing events and not using the google map technology to show the event-hosting place are not available in GitHub. Furthermore, most of the users are unsatisfied because of the high restrictions and complexity in codes. Academia.edu launched by Richard Price for academic purposes. [9] This system is not having a legal right or legal responsibility about research and user uploaded papers or materials and also it is not supporting event management. Moodle is another existing system developed by Martin Dougiamas by using PHP in cross-platform. Moodle is limited for specific users/institute. [8] Therefore it has lack of information and lower knowledge area. It is not allowed for any person in the world and on the other hand, we cannot create events, organize events. Coursera is a platform that gives the e-learning experience to the user which was launched by Andrew NG together with Daphne Koller. Coursera does not support event management and it does not allow users to upload their own files/ research papers and project details. It does not support in making groups and chatting with group members.

III. TECHNOLOGY ADAPTED

Over the past few years, there is a huge development in several kind of technologies. Development of technologies increase the easiness of working in different platforms in software development process. Different technologies have been used in each module to implement the system. Server side and Client side modules are implemented by using different kind of Technologies with the intention of make easier to fulfill the each and every functionalities of the proposed system.

The main technologies used to implement this web based knowledge sharing system is asp.net web forms, android, MSSQL, c# programming language and java using IDEs such as visual studio, android studio and SQL server Management Studio. Asp.net framework [1], c# and MSSQL were used to implement the web application while Android and Java were used for mobile application. Other technologies such as HTML, CSS, XML, JavaScript and JQuery were used in order to implement this system. Because of the reduction for codes in Asp.net application is useful for the implementation purposes as well as for understanding the codes later. The database was created using MsSql considering the main advantage of inexpensiveness.

Portability is also available in this technology, which means the ability of working in different OS environments. To the development of mobile application Android studio was used because of its capabilities for

debugging, code editing, profiling and testing. It also includes a rich layout Editor, consists with powerful code editing and that is supports for Mavens.

IV. ANALYSIS AND DESIGN

The analysis phase consisted gathering, capturing and analyzing requirements and designing phase concentrated on physical construction of the system. The main purpose of this phase was to convert the previously discussed requirements into a complete and detailed set of specifications, which will be used during the next phase[3]. In the analysis and design phase, several

UML diagrams were drawn such as activity diagram, sequence diagram, Use case diagram and context diagram [10]. The drawn EER diagram was the base for the creating tables and the database. There are several activities that occurs within the analysis phase. They are; Gather Information, Understand new system's requirements, Prioritize requirements, Evaluate alternatives, Meet with management to discuss new options and so on. Design phase is concerned with the physical construction of the system .It is important that the proposed design be tested for performance, and to ensure that it meets the requirements outlined during the analysis phase.

The System analysis Phase is the main part of the project and it is able to identify the overall direction that the project will take through the creation of the project strategy documents. Gathering requirements is the main attraction of this Analysis Phase. Here it is defined what the system should do in order to meet exact customer requirements. The following figure shows the top-level architecture of the system

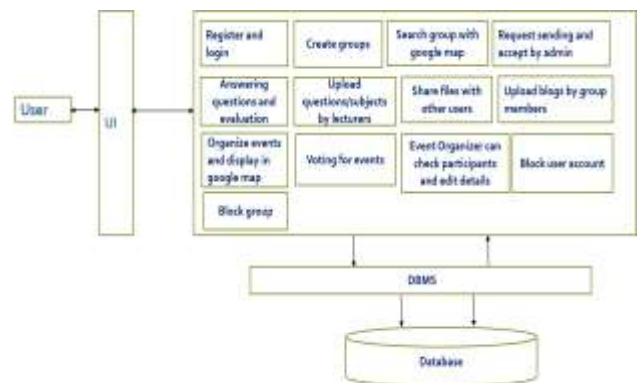


Fig 1: Top Level Architecture of the System

V. MODULAR APPROACH

To gather requirements, design, implement and test the system, module approach was selected. The system was divided into two main modules namely server side module and client side module [6]. When developing the server side module MSSQL database is used for the generation of the systems database and writing queries for obtaining certain data at specific instances.

The client side module was developed using Asp.net, C# in web application and Android and Java in mobile application. There are four main modules in the system called File uploading module, group handling module, question and answer module and event organizing module. The main actors in the system can be categorized as admin and registered users. Registered users are as students and lectures. Module diagram in the system is as shown below.

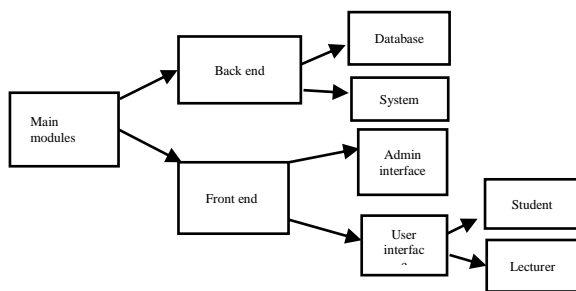


Fig 2: Module Diagram of the System

VI. IMPLEMENTATION

According to the gathered requirement from the client the system was designed by using UML diagrams, EER diagram and context diagram. UML diagrams include Use case diagram, Activity diagram, Sequence diagram and class diagram [5]. The component-based model was selected as the software process model as it is minimizing time wasting and reducing overall system failures. As a development team, it is easy to implement the system by integrating existing systems. Separate flow charts for the registration process, login process, group handling process, file uploading process and event organizing process have been designed prior to the actual implementation.

The web-based knowledge sharing system includes many processes. After registering, the user can log in to the system as a student or as a lecturer. The whole user registration and user login processes and validation of each signup and sign in forms was done successfully. The password reset function is completed. Therefore, if a registered user has forgotten his password he can select the 'forgot your password' option and reset the password.

The group-handling module was completed under following categories. A registered user can search for a group or if his desired group is not available, he can make his own group. If a user wants to join an existing system, he can send a request to that group admin and he has to accept it. Therefore, search for a group, join a group and send requests for groups in available on our system.

File uploading process is completed and a user can upload his files such as videos, pdf files, research papers to the system. File retrieving module was done and users can download uploaded files. Question uploading module is also completed which allows a lecturer to upload his/her MCQ papers. A student can answer them and calculate his progress. Problem and answer module is built including following features Students can upload their subject related problems occurred during doing some work. Others can reply on them by suggesting solutions to solve the problem as comments.

Parallel to the web application mobile application is completed. User registration, user login, Group creation, join to a group, send request to a group and file uploading processes are developed.

VII. EVALUATION

Evaluation phase is mainly focused on users. Because, Implemented system will not be a success when a user cannot gain what he/she expected from the system. As a solution, we decided to use questionnaire for several kind of users to get feedbacks about the system. This will be a best way to overcome our failures and add more features according to user feedbacks and comments [12]. By evaluating different kind of feedback forms to different level users and then will be analyzed them in a specific manner.

Three different feedback forms were distributed and the performance of the system was tested using randomly selected 90 users, 30 from each user (school students, school leavers and undergraduates). The evaluation aspects are based on their educational level, their understandability and their requirements. Feedbacks were taken in various perspectives and responses were taken as a five-scale rating namely Very Good, Good, satisfactory, Poor and Very poor .

Very good, Good, Satisfactory, poor, very poor grading levels were given consequently as 5, 4, 3, 2, and 1. Then total rate of each and every aspects will be calculated after gathering every feedback form. Then the total score was divided by total number of responders to get the average rating. Final rating was taken in two decimal places. Each evaluation aspect was calculated according to these steps and then took

the final results. Finally a line chart was drawn by using every final ratings results with the intention of finalize the users feedbacks.

No	Evaluation Aspects	Rating					Total score	No of responses	Rating
		Very Good	Good	Satisfactory	Poor	Very Poor			
1	User friendliness of the application	18	10	2	0	0	136	30	4.53
2	Concept of the application	14	12	4	0	0	130	30	4.33
3	Responding speed of the application	12	14	4	0	0	128	30	4.27
4	User interactivity of the system	10	16	4	1	0	128	30	4.27
5	Support for education	14	14	2	0	0	132	30	4.40
6	Ability of getting required learning materials without a payment	18	8	4	0	0	134	30	4.47
7	Maintenances of the system	10	14	5	0	0	121	29	4.17
8	Usefulness of the application for rural area students	17	9	4	0	0	133	30	4.43

Table 1: Feedback Analysis for Undergraduates

The questionnaire for Undergraduates includes 8 evaluation aspects namely User friendliness, concept of the application, responding speed, user interactivity of the system, the support for the education, maintenance of the system and usefulness of the application for developing countries. This feedback form was distributed randomly selected 30 undergraduates. From the user feedback analysis showed an overall rating of 4.09. The user feedback analysis is graphically illustrated in figure 3.

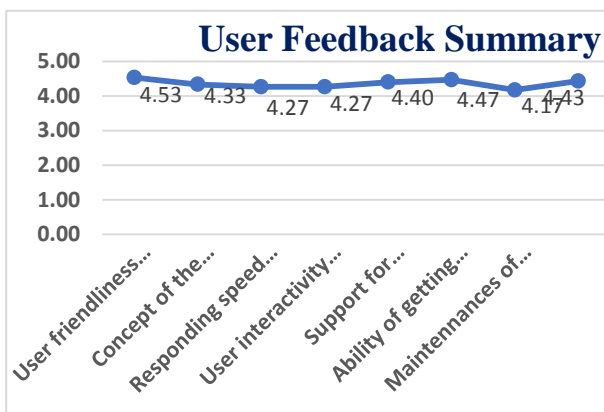


Fig 3 : Graphical summary of user feedbacks of Undergraduates

It was understood that a web-based knowledge sharing system is needed to improve the interconnectivity between universities and as a

platform for promoting events organized by the university students.

Table 2: Feedback Analysis for Schoolchildren

No	Evaluation Aspects	Rating				Total score		No of responses		Rating
		Very Good	Good	Satisfactory	Poor	Very Poor				
1	User friendliness of the application	16	11	3	0	0	133	30	4.43	
2	Concept of the application	14	11	4	0	0	126	29	4.34	
3	Responding speed of the application	12	12	5	0	0	123	29	4.24	
4	User interactivity of the system	7	15	8	1	0	121	30	4.03	
5	Support for education	14	14	2	0	0	132	30	4.40	
6	Usefulness of the application for School level Students	16	11	3	0	0	129	29	4.45	
									4.31	

The questionnaire for school children includes 6 evaluation aspects namely user friendliness, concept of the application, responding speed of the application, user interactivity of the system, support for education, usefulness of the application for school children. This feedback form was distributed randomly selected 30 schoolchildren. From the user feedback analysis showed an overall rating of 4.31. The user feedback analysis is graphically illustrated in figure 3.

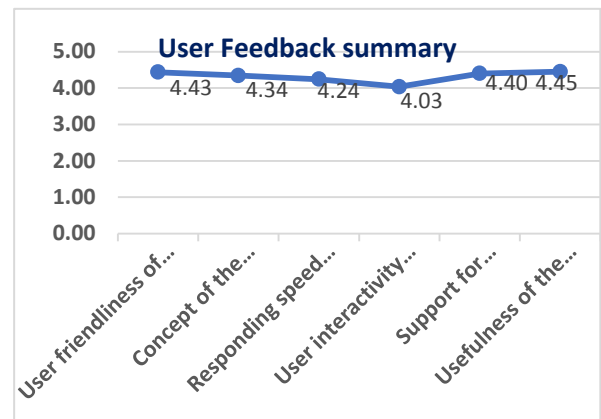


Fig 4: Graphical Summary of user feedbacks of schoolchildren

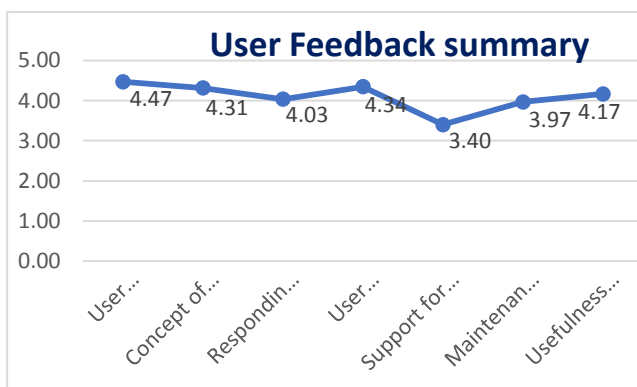
The need for a web-based knowledge sharing system for schoolchildren was clearly understood in order to

help them for their higher studies. Today in Sri Lanka, most of the children have to stop their school journey as they are not qualified for higher studies. Therefore, this platform provides a clear environment for the schoolchildren who are willing to engage in higher education but who have missed it and have no money to follow paid courses in private universities.

Table 3: Feedback Analysis for School-leavers

	Evaluation Aspects	Ratings					Total score	No of responses	Rating
		Very Good	Good	Satisfactory	Poor	Very Poor			
1	User friendliness of the application	14	16	0	0	0	134	30	4.47
2	Concept of the application	10	18	1	0	0	125	29	4.31
3	Responding speed of the application	6	20	3	1	0	121	30	4.03
4	User interactivity of the system	13	13	3	0	0	126	29	4.34
5	Support for education	14	8	0	0	0	102	30	3.40
6	Maintenance of the system	8	13	9	0	0	119	30	3.97
7	Usefulness of the application for developing countries	13	10	6	1	0	125	30	4.17
									4.09

The questionnaire for school leavers includes 7 evaluation aspects namely User friendliness, concept of the application, responding speed, user interactivity of the system, the support for the education, ability of getting required learning materials without payment, maintenance of the system and usefulness of the application for rural area students. This feedback form was distributed randomly selected 30 school leavers. From the user feedback analysis showed an overall rating of 4.35. The user feedback analysis is graphically illustrated in figure 5



VIII. LIMITATIONS

After implementing the system following limitations have been identified. Unavailability of bilingual support for the local users as the system is based on English. Therefore, users must be familiar with English language to work with system. When verifying the user using NIC it takes time because the NIC photograph should be checked by a human. In the file-uploading module the files are not uploading categorically. When providing blogs inside the system admin have to make a blog manually for the user.

IX. FURTHERWORK

Our proposed web base knowledge sharing system can be further improved by adding more modules than currently available modules. E.g. Group chat between group members can be include in the future. By using localizations, the system can be further improved to support more languages.

X. CONCLUSION

The aim of developing a responsive, specified and dynamic web application and a mobile application making a direct connection between knowledge seekers with the use of technologies like ASP.net web forms, CSS, HTML, JQuery MSSQL, Android and Java was successfully done. In order to achieve the above-mentioned aim following objectives have been defined and successfully achieved. Study of Java, Java script, .net framework, asp.net framework, Android studio, MS SQL and Study the behavior of knowledge seekers. Creating a system which consist necessary details about all entities was done as expected. In the web application we have design a responsive and dynamic web application with a community are by developing interactivity of the users which were important objectives of the system. Together with the web application, developing a mobile app to attract more people is achieved. Evaluation of the proposed system by distributing feedback forms and analysis of the feedbacks was done as expected. Preparation of the final documentation objective is completed within the given period.

XI. ACKNOWLEDGEMENT

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