RESEARCH ARTICLE

Design and Implementation of Web Based Collaborative Learning Model for ICT Course of College Student in Bangladesh

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Abstract—The present age is about information technology. In order to build technical human power, the higher secondary education board of Bangladesh has launched a new course named Information and Communication Technology (ICT) as compulsory subject for intermediate college students in the traditional way. Statistic has shown that there are many lacking in the traditional system to teach ICT course. Lacking of proper amount of ICT based and qualified teacher is one of them. This paper examines the inadequacies involved with traditional system of learning the ICT course and proposes a solution by developing a technology enhanced web based collaborative learning (WBCL) model named "ICT Course Helper (ICH)" that will increase the ICT based knowledge of learners. Finally, the model is implemented and surveyed. The survey result indicates that the proposed and developed system may give better result than conventional learning procedure of ICT course to the student.

Keywords— web Based Learning; Collaborative Learning; ICT; NCTB; QA procedure.

I. Introduction

The National Curriculum and Textbook Board (NCTB) of Bangladesh have introduced information and communications technology (ICT) as a compulsory subject in this academic year for higher secondary students who would be taking the public exams in 2015. Board officials said that the ICT would be a 100-mark paper in addition to the six 200-mark papers. There are 1,928 colleges offering HSC courses for which 5, 25,443 students are enrolled, 1,401 alim madrasah's for which 4,02,431 students are enrolled. There more than a hundred thousand vocational and technical students [1]. Only a little number of colleges has ICT background

teacher. Teacher of different discipline are engaged to teach the course. It is not possible to provide the necessary number of qualified teachers to the college in the meantime to our government. So what will be the situation of 10, 27874 student in the final exam that is mentioned for a single session? Through the traditional class based learning system it is impossible to recover this problem. In traditional learning system it observed that student is more conservative in knowledge shearing. They are not egger to group discussion though without sharing knowledge or group discussion a nation cannot earn desired success. In these regard we propose a web based collaborated learning model that enhances the ICT based knowledge to learners through collaborative learning. It is proved that collaborative learning develops the shearing quality of student and make broad minded. We named the system ICH. To develop the model we used three methods. The methods are providing Technology Enhanced Learning (TEL) Materials, Question and Answering (QA) Procedure and Group Discussing (GD). Technologies enhance learning means learning with technology such as text, image, video, animation and software demo. This system is integrated with this feature. Challenges always surround the success. To develop the system we had to face so many challenges such as data collection from different region of Bangladesh, to address the collaborative learning with student as students were unfamiliar with it, developing web site and so on.

II. Web based collaborative learning system

Web based learning offers many benefits over traditional learning environments and has becoming very popular. The web is a powerful environment for distributing information and delivering knowledge to an increasingly wide and diverse audience. Students who study a course on the Internet tend to be more heterogeneously distributed than those found in a traditional classroom situation [2]. Web-based learning (WBL) as an increasing acceptable learning environment offers many possibilities, such as approaching new groups of students [3], the freedom of choosing the time to learn anywhere, anytime and the way students prefer, and collaborative learning environment. The internet is more than technology and medium, and it is a Web of social relations imaginatively constructed by symbolic processes initiated and sustained by individual and groups [4]. In our application college students will get all the solution of problems together in many formats such as text, ppt, image and video. The video is appropriate to minimize the need of computers in college. In this site only the ICT course related topics will discuss for redundancy of irrelevant data. Online learning adaptation of college students directly affects the students' effectiveness of online learning [5]. On the other hand Web-based collaborative learning environment is developed with information technology and collaborative education method, and web-based collaborative learning is one of the many student-centered approaches that aim to promote education achievement, and to foster interpersonal communication and cooperation [6]. To address the issue of QA and online teaching and learning we are looking at a two phase process, the first of which is the development of an initial audit tool examining online technical aspects followed by the collaborative development of a peer review process centered on pedagogical issues[7].Computer-mediated Communication (CMC) systems in language teaching and learning refers to the net based computer systems which offers opportunities for group communication such as Newsgroups, E-mail conferencing, Internet Relay Chat, Bulletin Board System and Virtual Classrooms through which collaborative activities such as discussions, debates, games/simulations, role-plays, case studies, etc. can be performed[8]. The understanding power is not same to of all students. Peer to peer interactions facilitate knowledge sharing [9]. Through the collaborative learning process students as well as teachers can share his/her idea, thinking or problems to with his/her peer. Collaborative learning has been proved to improve students' skills in learning and enhance their satisfaction with learning. Several studies investigating college-level learning found that students who follow in-class collaborative learning procedures and actively interact with each other are more satisfied with their learning experience and evaluate their courses more favorably than students who are exposed to the traditional lecture method [8]. A collaborative work has less chance of error and has greater visibility [10]. Web-based learning systems are increasingly popular due to their appeal over traditional paper-based textbooks. Web courseware is easily accessible and offers greater flexibility, that is, students can control their own pace of study. Unlike printed textbooks, Web-based tutoring systems can incorporate multi-media such as audio and video to make a point [11]. The web-based collaborative learning model consists of five parts: Collaborative learning strategy, user information Library, student interface, teacher interface, and administration or expert team. The structure of web-based collaborative learning model is shown in Fig. 1.
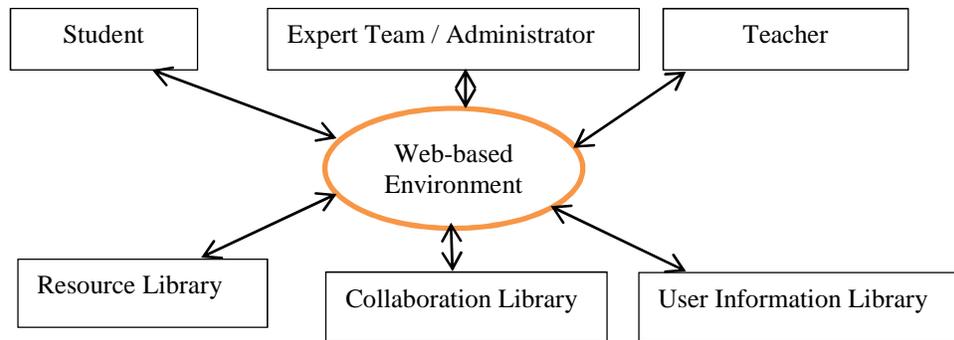
Fig. 1: The structure of web-based collaborative learning model

A. Collaborative learning strategy

It is the basis of collaborative learning management, and the strategy lies in the rules which are recorded as collaboration rule library. Collaboration rules are represented by conditions and results.

B. User information library

It consists of administrator information, teacher information, student information, and authority assignment.

C. Student interface

It consists of user interface, learning model, and basic Information model, which will help students fulfill learning goal. This interface will instruct students and record learning information during learning phase.

D. Teacher interface

It is to help teachers to monitor and manage teaching process, through which teachers can establish, organize, modify and delete education resources, and provide instruction services for courses.

E. Administration/Expert Team

Administration is responsible for maintaining and managing this web-based system, and administrators could maintain this system and databases through this module. Since collaborative learning approaches can be divided as synchronous learning and asynchronous learning, administrators and teachers would manage collaborative learning environment, such as making grouping policies, collaboration rules and requirements. The key functions in collaborative learning systems are user management module, synchronously collaborative learning module, asynchronously collaborative learning module, online test module, and education resource interface module [6].

III. ICT course helper model

ICT course started from 2013 in NCTB. Traditional education system is face to face conversation and in the class room teachers teach the student using black board. ICH is the web based version of this course with the elaborate discussion and many examples, so that more student can take part in and benefit from it. Discussion board helps the students and teachers to video conversation or real time chatting with their online group mate.

A. Aim of ICH

Through this project, we want the students to be more efficient learners in ICT academic field. The burden of memorization will be reduced as a learner is able to get any kind of help from the system. Meanwhile we hope this system will help the students in higher education.
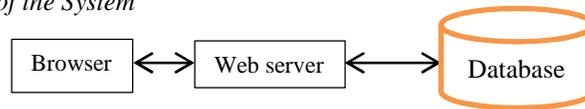
B. The Technical Implementation of the System

Fig. 2: Browser/Server

We have a web server built with Apache and a database built with MySQL running on a windows server .Webserver provides student and teacher clients with interface to access the reading material, and enables them to do comments on answer and also can put questions. According to the comments client will be suggested for next step.

C. Structure of the system

In order to better understand our model includes asking and answering option, expert team, and discussion boards. After reading the topic the students can test him through online exam. Discussion board helps the students and teachers providing the facilities of group study (Fig. 3).
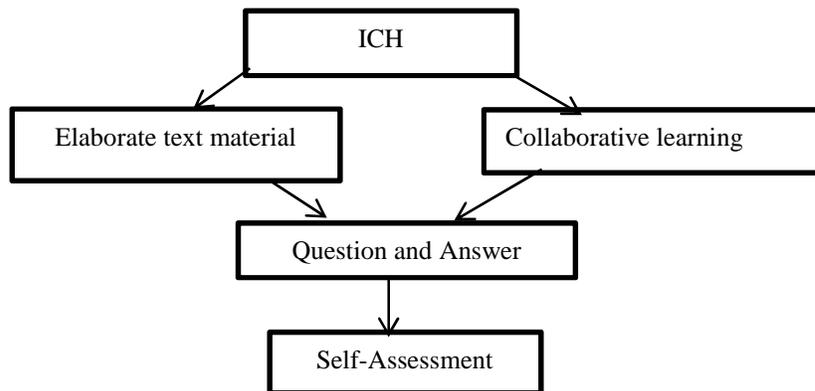

Fig. 3: Structure of ICH Application

D. Learning Procedure

All of the chapters and topics under the chapters are in the reading module. After entering the reading system, learners will be able to select a specific chapter. When a certain category is chosen, titles of all the topics under this chapter will appear to the learners, from where learners can select the topic they want to learn. At first learners can read the text and if they understand the topic they can test themselves for self-judgment (Fig. 4). If the learners don's understand the topic they see more example in video, audio, image, extended text for better understanding. Secondly the mentioned type documents fails to better understand he/she can ask questions or discus with the group study.
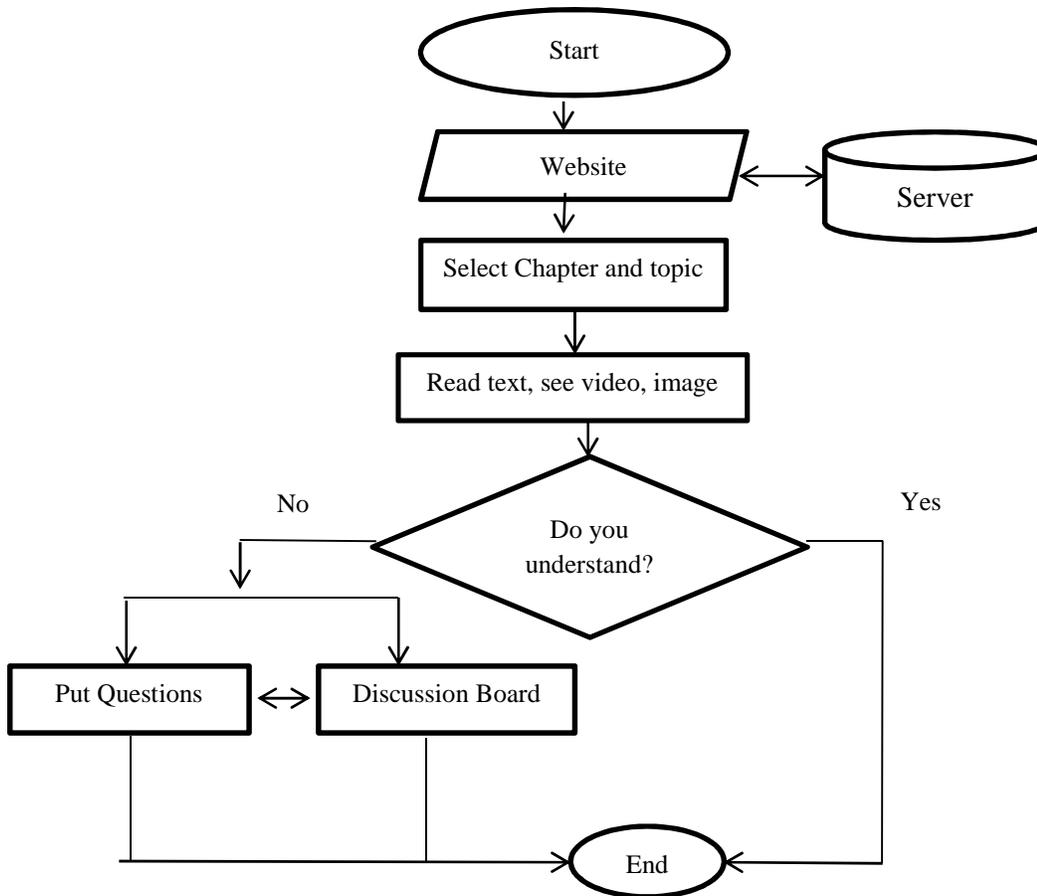
Fig. 4: Learning process of a learner

E. Collaborate Learning with Group Discussion

This application provides a discussion board for collaborate discussion. The member of expert team is the permanent member of discussion board. Learners who want to join the discussion board firstly have to sign in for permission. All rules of collaborate learning are maintained during discussion. Synchronous or real-time chats provide learners with one of the few online experiences in which they can receive immediate replies to their questions or comments, thereby allowing for a conversation to develop with the spontaneity of the traditional classroom [12]. Asynchronous discussions (normally in online bulletin or discussion boards) offer the opportunity for learners and instructors to carry on a conversation at convenient times. Because of each participant in the discussion may select a time to reply to the latest addition to the conversation, the flexibility in pace and length of the conversation can vary greatly.

F. Questions and Answer

After reading the text student can see the video tutorial. If anyone does not understand the topic he/she has another option. The learners can put a question about the topic or lines or terms that he/she does not understand. Expert or anyone can answer that question.

G. Self-assessment

After reading any topic, learner may test his understanding and judge his ability with examination. The expert team is responsible for monitoring and evaluation. Our application holds both MCQ and Witten exam.

IV. Model implementation

We have implemented the application in Bangla language for better understand. Learner (student/teacher) can select a topic under a chapter (Fig. 5).

Fig. 5: Topic selection for reading

The question and answer procedure is shown in following fig. 6. Learner ask question that is open for all. Expert team as well as student and teacher can answer the question. All the answers are justified by expert team before publication.
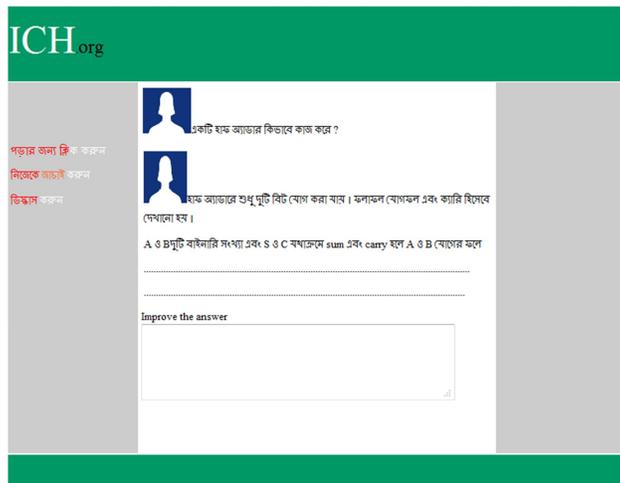

Fig. 6: Q/A procedure

V. Evaluation of ICH

After implementing our idea we have made a face to face survey on 10 colleges for judgment our model showing our website. Total 20 teachers and 500 students took part from different colleges of different area of Bangladesh in the survey. TABLE 1 shows the survey profile.

TABLE 1

Visiting college name and location

| College Name	Location	Area status	No. of teachers	No. of Students
Dhaka city College	Dhaka	City	2	50
Rifles Public School and College	Dhaka	City	2	50
Vikharunnesa College	Dhaka	City	2	50
Govt. Sayed Hatem Ali College	Barisal	Town	2	50
Amita Lal Dey College	Barisal	Town	2	50
Barisal Model College	Barisal	Town	2	50
Govt. Patualhali College	Patualhali	Sub-Urban	2	50
Babuganj Degree College	Babuganj	Sub-urban	2	50
Jonota college	Dumki	Rural	2	50
Kodom Tola College	Angaria	Rural	2	50

Their comment about our model is shown in the chart.
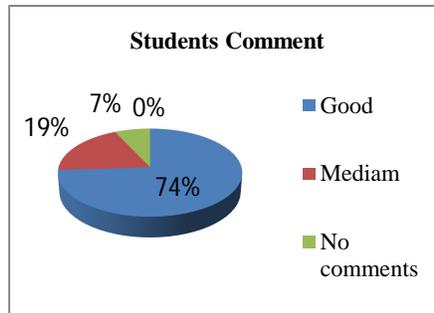
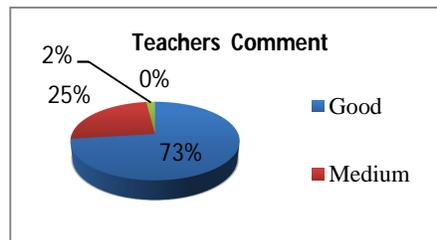Fig. 7: pie chart of students comment about ICH

Fig. 8: pie chart of teachers comment about ICH

VI. Analysis of survey result

From survey we have found that 74% students (Fig. 7) and 73% teacher (Fig. 8) say our model is a good one and 19% student and 25% teacher said it's a medium. 7% student and 2% teacher did not make any comment. There is no vote on behalf of Bad. It's a positive sign of our model.

VII. Conclusion

Web-based learning (WBL) as an increasing acceptable learning environment offers many possibilities, such as approaching new groups of students, the freedom of choosing the time to learn anywhere, anytime and the way students prefer, and collaborative learning environment. ICH is developed in Bangla language because maximum students study in Bangla version in higher secondary. ICH provides three features such as extra learning resources, collaborate learning and QA procedure. Extra learning resource means resource of different format (text, image, animation, and video and software demo for practical) will be available. In QA procedure learner may ask question to anybody. Mainly expert team is responsible to answer the question. Different learner can answer the question but cannot publish the answer without permission of expert team. Collaborative learning environment is one of the most important feature in where learner can group discuss with his/her peer according to the collaboration learning rule. A learner may test his/her skill after reading a topic through exam. ICH mainly consists of two interfaces. They are learner interface and expert team interface. We will also develop the model under social network. It's our future plan.

Acknowledgement

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