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Avabodhaka: A System to analyse and facilitate Interactive Learning in an ICT based system for Large Classroom

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Abstract

This paper proposes an ICT based system for enhancing teaching and learning in a large classroom and increasing the interactivity to improve learning. Typically, such a classroom suffers from difficulties in audibility of lectures, seamless teacher-student interaction, monitoring attention of students, collecting attendance and conducting examinations. BYOD (Bring Your Own Device)[1] paradigm has been assumed for this system. The paper focuses on a method for improving interaction in the classroom by monitoring students' activities. A report for non-interaction with the system is sent to the teacher after regular intervals, which will assist the teacher in identifying students with low interest in the class lecture. All the activities and interaction of the students in the class are stored as activity records in the system through which the level of interaction of the student can be made. The proposed system solves both the problems associated with teaching and learning in a large classroom as well as helps in prevention of frequent use of smartphones for non-learning purposes. An empirical study was conducted to test the acceptability of the system. The results obtained from the experiences of the participants were found to be encouraging and positive.

Keywords: Classroom interaction; E-Learning; Information and Communication technology; User Experience

1. Introduction

Use of network and human centric computing has allowed in extending the traditional learning methodologies and has laid a strong foundation for experimenting with E-learning. Such systems have the power to transform the performance, knowledge and skills of the users as in a traditional class and even more. Application of Information and Communication Technology (ICT) in E-Learning systems has fetched dramatic changes in higher education. In this perspective, Internet fulfills the emerging demand for advanced study material and supplementary resources.

Use of ICT in E-Learning has brought dramatic changes in the educational sector but teaching and learning in a

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large classroom typically has some unusual challenges. The teacher either uses lecture slides projected on to a screen or a blackboard or uses a personal announcement system for lecturing. Students sitting at a distant from the teacher faces difficulty in viewing the slides from the screen and in hearing the lecture clearly. Although the purpose of using a microphone is to make the lecture audible, it is often observed that poor acoustic design of the classrooms makes the lecture inaudible at many parts of the classroom. A vital factor in classroom teaching and learning is the interaction between students and the teacher[4] .In traditional large classroom, effective interaction between students and their teacher has been found to be difficult[10]. It rarely has a lively discussion and interaction. Generally, a limited number of students in the close proximity of the teacher take active part in class discussions. Hence, teachers have difficulty in assessing the concepts of the students and get very inadequate time for resolving questions put forward by the students[11]. For instance, when an instructor asks for the comments of the students, the number of people attempting to speak rarely reaches 5% to 10% of the strength. However, when asking the same question and allowing answering anonymously with a clicker, the level of participation raises significantly, which shows positive effect on the process of learning[6].

In such a large classroom it gets demanding and difficult for the teacher collect and monitor attendance, interact one-to-one basis, scrutinize the performance of the students on a regular basis. The teacher also fails to monitor whether the students are paying attention in class lectures. Due to these factors, the effectiveness of learning decreases.

BYOD[1] (Bring Your Own Device) paradigm has been used to develop a system that aims to enable effective interaction in large classrooms using ICT solutions. Different   usability metrics have been used to measure task-success, time-on-task, efficiency and learnability. The method proposed for effective interaction and monitoring attention of the students in the class will increase their concentration levels in the classroom. The activities of the students are recorded as activity records which allow understanding the level of interaction of the student in the class quantitatively. Teachers are facilitated with various graphical charts and statistical information which enables them to monitor the progress of individual students in the class.

2. Literature Review

In a large classroom, it is expected that students will have a lot of queries and comments, and to read and answer all the queries by the teacher during the class hour will be time consuming and inefficient solution. Cheung[3] gave an approach to use mobile phone messaging to record the responses of the students in the class. Here, the author demonstrates how mobile phone messages can be used to solve the problems and limitations of pencil-paper and classroom interaction.

Anderson et al.[2] presented an approach to improve the interaction and learning experience of a class. They developed a system named "Classroom Presenter system" in the University of Washington. This system worked on the "BYOD" philosophy. Teacher can share slides with the students. Students were allowed to make alterations in the slides like highlight the text, writing any comment. Lindquist et al.[5] demonstrated the design and use of mobile phone extension to "Classroom Presenter system". In this system, students were permitted to submit solutions of active learning exercises in the form of text or photo messages. However, in the above works, if the teacher goes through all the slides to choose the best one, then he needs a lot of time to search but if he selects any random slides from the server then it is very much possible that the changes made in the selected slide is not very good for the discussion. As mentioned Lindquist presented an extension of Anderson's work and his work also faces the same problem as Anderson's work. But these works are not able to address challenges relating to interaction in the classroom and doesn't discuss about exam conduction or attendance collection.

The NPTEL[8] massive on-line courses program, started since January 2013, is another initiative to address the infrastructure bottlenecks prevalent in the tertiary education sector in India, although it does not address the classroom interactivity. Similarly, attempts to setup virtual classrooms and e-learning portals are not suitable to solve the issues in large classrooms. "Moodle[9]", free and open-source software learning management system distributed under the GNU General Public License help educators to create online courses with a focus on interaction and collaborative learning content, and it is in continual evolution. However, such systems are unable to deal with issues inside a large classroom with an instructor and hundreds of students.