K-031

Response Collector Operatable with Pentop to Realize Interactive Classes

Nguyen Thi Hong Phuoc, Takato Nakai, Fumiko Harada, Hiromitsu Shimakawa

1. Introduction

In large-enrollment classes of universities, many students are taught in the un-interactive class which the communication is just one way from one lecturer to all students. In those classes, it is very difficult for the lecturer to catch the level of student understanding from formal assessment such as reports or examinations.

The importance of frequent communication between students and lecturers is emphasized in many universities. Various methods of holding interactive lectures have been shown to enhance student understanding. The interactive communication between a large group of students and the lecturer has been carried out by simple voting by hands, volunteered verbal answers, written tests, small group discussions, and the Flashcards. However, these methods do not enable immediate calculation of quantitative data that enables students to see their understanding amongst their peers. Written tests are costly and time consuming. If they are not summative, they are seldom taken seriously by students. Furthermore, those methods even cause the encumberment to students while they are studying. Whereas, grasping student understanding level interactively will help student to increase knowledge. It also enhances their studying motivation. In addition to that, it enables the lecturer to advance and adjust lecture in a proper way.

To solve above problems, this study proposes an interactive system which is designed to acquire student understanding level interactively. This approach gives students a chance to express themselves and share ideas, as well as let lecturer understand more about his student understanding level and his current teaching method

2. Existing Interactive Class Tools

There is a study aiming to develop a system for enhancing interactive communication between a lecturer and students to grasp the understanding level of students during lecture time [3]. The system is designed with user-friendly button-interface. It can be installed on a PDA to be used by students to express their understanding level of lecture contents to the lecturer side. As a result of applying this system to real lectures, this system has proved to it can promote interactive communication between students and teachers, in a real time manner during lecture. However, because of using PDA devices, the studying and the thinking of the students will be interrupted during a lecture because they have to put down their pen and push the button on PDA screen. Besides, the cost is fairly high. The maintenance cost is also a problem. It needs efforts to deploy the tool because PDAs must be delivered to and collected from each student before and after lecture time, respectively. Therefore, for enabling the merit of interactive class, there is a need of bringing out an inexpensive, easy-to-maintain system which never encumbers the studying of students during lecture.

Graduate School of Science and Engineering,
Ritsumeikan University

3. Response Collection for Class
3.1 Response Collector Operatable with Pentop

In this study, we suggest a system of promoting the interactive communication for large-enrollment class by getting student reaction for the explanation of the teacher during lecture time. Student will use a button interface device to convey their understanding level of the lecture or answer of small quizzes. To prevent it from blocking the studying of students, the button device should be

- designed with small size for not to occupy large space on the table, and
- easy to push even with top of the pen.

By enabling to push buttons with top of the pen, students can use it while noting lecture contents without any inconvenience as well as interruption to their thinking too. This system let the teacher grasp the lecture understanding of students and shows the understanding level to the both sides of teachers and students in a real time manner. Auspiciously, this tool will bring out the positive impact of class interactive indicator on teaching and learning.
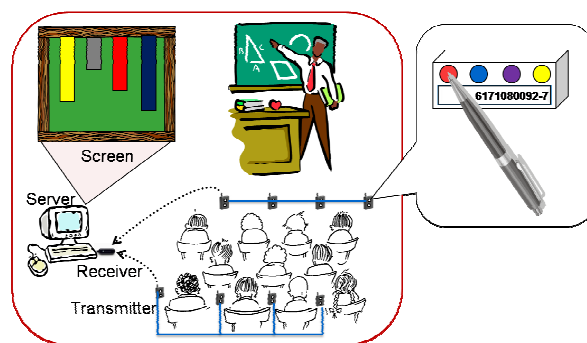

Figure 1. System Overview

3.2 Portability vs. Deployability

The truly wireless high-speed mobile device enables the increasingly compelling choice of technology for classrooms, especially the frequent and integral use of portable computational technology. For response collection in interactive class, wireless connection is preferred because of its portability in using and easy deploying the system. However, in several cases, the deployment of portable devices may hinder the studying during lecture time. It may also cause the inconvenience in using or even the difficulty in maintaining the system with high costs. The system must be cost conscious so that the technology should be truly and effectively applied and used by many lecturers and students.

Therefore in this study, the model of partial-portable transceivers which are connected by group wire-connection will be introduced for achieving the most effective combination of portability and productivity of technology. Transceiver consists of an ID tag reader, which enables students to give their ID with ID tags they bring portably, and a button device, which is

deployed on the table fixedly. A group of devices which are on the same table are connected to each other by wired connection. Then one device in each group will be pre-set as an access point in wireless connection with server side. Though it is not possible to take full advantage of portability in using wireless connection, but promisingly allows us to obtain the advantage of both deploying and maintaining in using group-wired connection.

3.3 Learning Motivation Enhancement

Traditional ways of teaching, which work well only in small classes, are not appropriate to the culture of mass higher education. It needs a different motivation. Carrying out the real time response improves the way of thinking of the student, becuase the teacher can advance a lecture in a better way from the viewpoint of students based on their reaction during lecture time. Student can have higher studying motivation according to the most suitable materials or teaching method for them, so that they can concentrate more on lecture contents and gain more knowledge effectively. It can raise the participation willing of students.

4. Realization Method

4.1 System Structure

The structure of system is described in figure 2. Button-interface device is used for both conveying the understanding level and answer of small quiz to server. A predefined button device acts as an access point for a group of them which is connected by wire inside group. That wired-connection group is used as communication link between transceiver and receiver. Data are received at the server side by the receiver. The receiver can receive data from many access points at the same time. Data are stored to a database from the server, and loaded from the database to be summarized at the server. The data after the summarization will be shown at the big screen in the class.
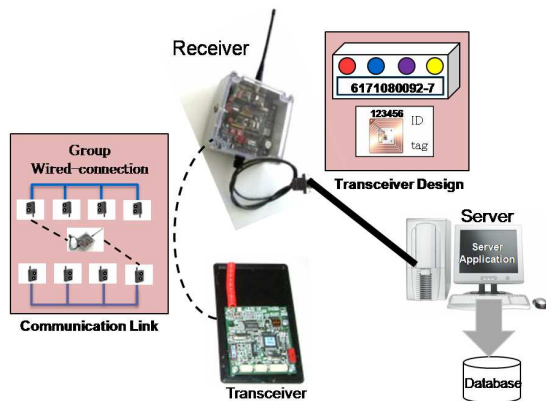

Figure 2. System Architecture

4.2 System Implementation

The system includes both hardware and software components as shown in figure 3. A receiver will be connected to a server computer for receiving data which are sent from a transceiver, which is a set of a button device and an ID tag reader. Server applications are designed to ensure the functions of the system as follows: grasping the lecture understanding level of students and carrying out small quizzes or questions during lecture time based on collecting and processing data

received by the receiver. In addition, server applications are also capable of analyzing data of individual students, so that the lecturer can catch the studying habit of each one.
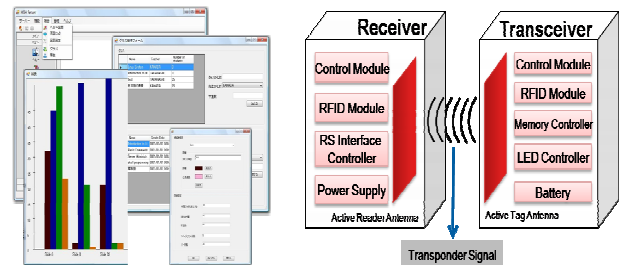

Figure 3. Software and Hardware design

5. Comparing with Related Studies

Many studies on lecture supporting have been carried out in the world. It is proved that student response technologies are potentially useful teaching and learning tools that students enjoy using. However, one is only beneficial to the extent that faculties craft useful questions and facilitate student discussions in order to foster an active learning environment [1]. As shown in another study, students refer to the lecture document displayed on a small computer during lecture time and can ask their questions directly [4]. Then teacher can grasp which part of the lecture students want to ask for definitely. However, the teacher cannot grasp the number of people showing their reaction. He finds it difficult to judge it.

In this study, an active environment for studying in large enrollment class is carried out with the response collecting, counting and showing to both sides of lecturer and students during lecture in a real time manner. This study aims to not only realize an inexpensive, easy-to-use-and-deploy class support system but also facilitate students to respond during noting, especially in large-enrollment classes.

6. Conclusion

This study has proposed a system which is easy to use even with the top of the pen for improving student learning without blocking their studying. It also makes teaching effective through grasping the understanding level of lecture from students.

Hereafter, this system will be experimented in real university class for one semester to validate its effectiveness. Lecture of around 500 attendance students is divided into two classes in which is and is not applied this system. The average points of examination will be compared.

References

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