

Augmenting Teacher-Student Classroom Interaction Using Mobile Messaging

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Abstract: Interactivity in a classroom environment is a usual concern among teachers, where the students lack interaction with the teacher and are unresponsive to teacher-class dialogue. The use of wireless, mobile, portable, and handheld devices are gradually increasing across every sector of education. Such utilization of technology in the classroom serves as a key motivator for students. This project aims in improving the learning process by using mobile messaging to augment and create a more interactive learning environment.

Keywords: Augment Classroom Interaction, Mobile Messaging, Bluetooth, SMS.

Introduction

Decreasing classroom interaction is a growing concern among teachers. Students lack interaction with the teacher and are unresponsive to teacher-class dialogue. This is evident when a teacher initiates interaction, such as asking questions related to previous discussions, expecting students to participate and engage in peer discussion activities yet none of the students respond. Even if the students understand the question, or know the answer, most often these students do not take part in classroom interaction. Furthermore, students tend to be very reluctant to ask questions to the teachers or give feedback in class.

The traditional learning environment has provided universities with a cost effective and scalable means of teaching students. However this has come at the price of making interaction difficult and inefficient, leading to reduced student engagement, motivation and learning. The work of Mazur [1] suggests the use of interactive pedagogies that are able to engage students in peer discussion and activities, guided by the lecturer, can result in effective student learning outcomes. Using interactive classroom pedagogies it is possible to promote a more active learning environment, increase the motivation of students, inform the work of teachers and generally enable a genuine learning community in the classroom. Sharples [2] also suggests the application of the conversational learning theory to mobile learning. The fundamental idea is that learning occurs through conversations and interrogation of a subject matter between learners and teachers in an interactive classroom environment. And due to such outcomes of conventional environment, the proponents saw a need to augment teacher-student classroom interaction using mobile messaging.

This project aims to improve learning process by using mobile messaging to augment and create a more interactive learning environment.

1. Background

The use of wireless, mobile, portable, and handheld devices are gradually increasing and diversifying across every sector of education, and across both the developed and developing worlds [3]. Mobile learning or m-learning has attracted the interest of educators, researchers, and companies developing learning systems and instructional materials [4]. Despite limitations in the computing, networking, and interface capabilities of mobile phones, they are the most promising technology today for supporting classroom active learning in the wild [5]. The use of the cell phone technology in the classroom served as a great motivator for students. It seemed that some students could communicate with the teacher better by texting, creating space between them rather than face-to-face contact [6].

A number of research studies were made on mobile phones as a tool to augment teacher-student interaction. Mobile Messaging Feedback system (MMFS), a client-server prototype system developed to promote interaction in a class via mobile phone and Bluetooth. MMFS enables students to anonymously send questions using their mobile phones via Bluetooth to the lecturer's laptop. The lecturer sees the feedbacks in real time on her laptop and she can develop the interaction further by verbally addressing the feedbacks [7,8]. Another classroom interaction system is the TXT-2-LRN system. The development of the TXT-2-LRN (text-to-learn) system is based on the assumption that nowadays most students have a SMS enabled mobile phone and that they bring it to the classroom [9]. With this opportunity, a system was developed that allows the students to send SMS messages to the mobile phone of the teacher (which is connected to his computer).

Although these systems exist, some issues should be considered. First, not all mobile phones have Bluetooth functionality. Second, sending SMS message via mobile couriers for class interaction is costly. Lastly, receiving feedback from the student is not the end of interaction. Interactivity is a loop originating from and concluding with the student [10].

2. Methodology

The system's basic infrastructure is shown in Figure 1. It starts with the student's mobile phone which sends questions via SMS or Bluetooth. Connected with a mobile phone and a Bluetooth USB dongle, the teacher's computer then receives and manages such questions. Lastly, the teacher filters and displays fitting questions on the projector screen.

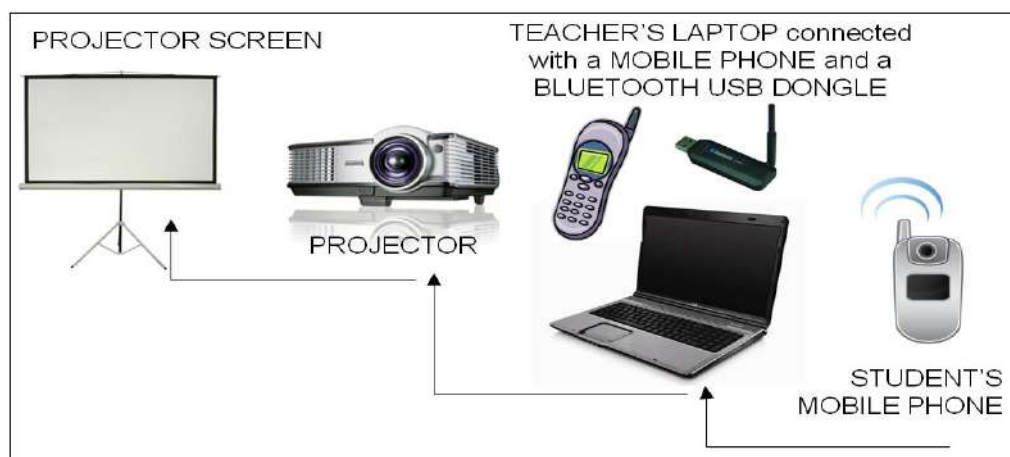


Figure 1. System Architecture

Client and server applications were created. In order to send messages to the teacher, a client application must be installed on the student's mobile phone. The server application is necessary to allow the teacher to receive and manage messages in the computer while lecturing. While the server application is running on the computer, the projector screen will display the lecture presentation. Messages sent by the students will only be displayed after the teacher has filtered unrelated and inappropriate questions.

3. Results and Discussion

A mobile messaging system for augmenting classroom interaction was developed. The system includes a client application and a server application as well. Figure 2 shows how each module of the system interacts with each other. Bluetooth Message Receiver Module retrieves all the messages sent by the Mobile Client Application. The Text Message Receiver Module retrieves all the text messages sent to the SMS Gateway Server. All retrieved messages will then be relayed to the Message Management Module which will manage all messages and also provide functionalities like approve, delete and display. All messages that were tagged as approved will be displayed via the Display Module on the Extended Desktop monitor.

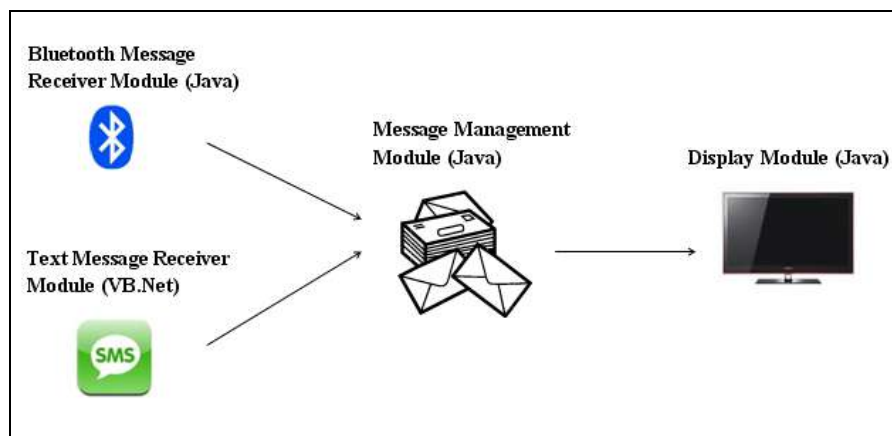


Figure 2. Messaging System Diagram



Figure 3. Bluetooth Message Receiver Diagram

Figure 3 shows how the Bluetooth Message Receiver works. Bluetooth enabled phone may use the Mobile Client Application to send messages to the Server. Only the Mobile Client Application can send message to the Server via Bluetooth. All the messages relayed via Bluetooth will be managed and retrieved by the Bluetooth Message Receiver Module of the Server Application.

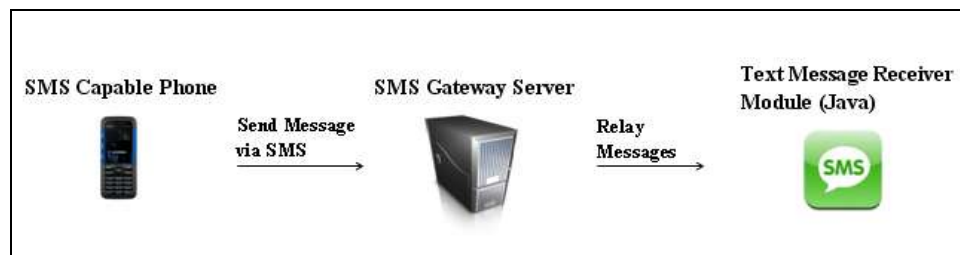


Figure 4. Text Message Receiver Diagram

Figure 4 shows how the Text Message Receiver works. An SMS capable phone can send text message via SMS to the SMS Gateway Server. All messages received by the SMS Gateway Server will then be relayed to the Text Message Receiver Module.

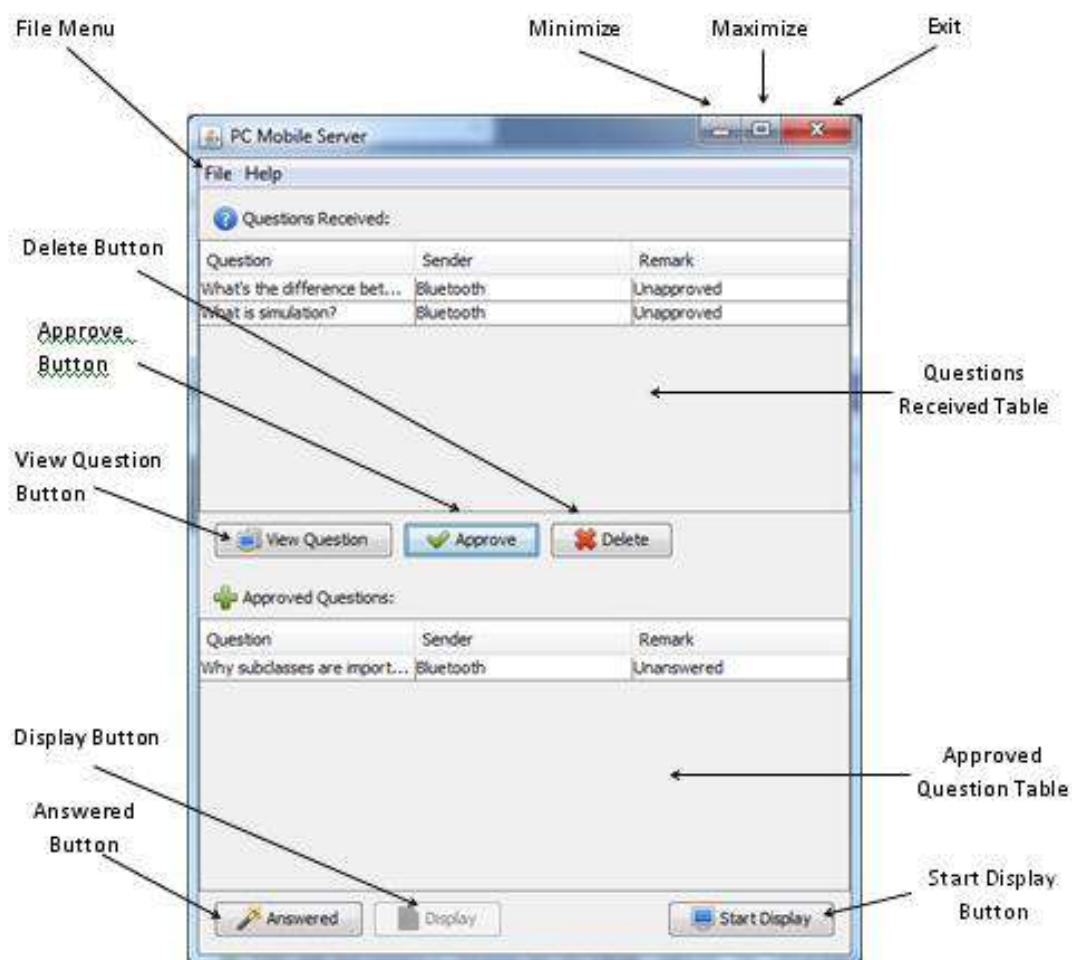


Figure 5. PC Mobile Server Dialog Window

Figure 5 shows the Dialog Window of the PC Mobile Server along with the necessary interfaces. All incoming questions will be displayed in the Questions Received Table wherein a preview of the question, the sender and remark are shown. All of the questions received are still subject for approval by the teacher.

Clicking the Approve Button will move the highlighted question to the Approved Questions Table. The Start Display Button pops out a window displaying the first question. The teacher may then drag the window to the Extended Desktop so only the

questions can be seen. The teacher can also display the highlighted question by clicking the Display Button.

4. Conclusion and Recommendations

This project aimed in improving the learning process by using mobile messaging to augment and create a more interactive learning environment. To create this environment, a mobile messaging system was designed and developed. A client application, installed on the student's mobile phone, sends messages/questions to the teacher thru Bluetooth or Text messaging, while a server application, installed on the teacher's computer, receives and manages such messages. As the server application is running on the computer, the projector screen displays the lecture presentation. Messages sent by the students are then displayed after the teacher has filtered the received questions.

Mobile learning has attracted the interest of educators developing learning systems and instructional materials [3]. This project contributes to this realm of learning whereby students communicate with the teacher instantaneously through the mobile phone technology. This project also reinforces the existing research of Scornavacca [11] which shows that classroom interactivity using mobile devices is preferable to traditional interactive methods. With the ongoing developments in networking and interface capabilities of mobile phones, mobile learning may someday be the greater support for classroom active learning.

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