

## Chapter 5.14

# Mobile Interactive Learning in Large Classes: Towards an Integrated Instructor- Centric and Peer-to-Peer Approach

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### **ABSTRACT**

*This chapter aims at describing a new platform for mobile and interactive learning targeted as an effective communication medium between the professor and students during lectures. In this system, students and professors will be equipped with a Multimedia Messaging Service (MMS) capable device (which may be PDAs, Laptops, or Tablet PCs) that is connected on the campus-wide Wireless LAN. During lectures, students can ask questions, response to questions or give immediate feedback on the lecture simply by composing a MMS message and sending it to the professor. The main advantage of this learning system is that MMS messaging is easily extensible to the mobile GSM networks, so students are not restricted to use it only on campus. In addition to enabling better interaction between students and instructor, an approach to facilitate student-to-student interaction during a lecture for peer-to-peer learning is proposed, which can be easily integrated into our existing system.*

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## INTRODUCTION

This is an era of global mobile communication, in which instant communication and information transfer are the major driving forces of the society. In keeping up with the advancement of technology, the learning process has also undergone through rapid changes. The introduction of the Internet and e-education (including e-learning and e-teaching) have changed the way knowledge and education are being transferred to students all over the world. In this chapter, a new learning platform developed in Nanyang Technological University (NTU), which utilizes the latest technologies to bring a mobile interactive learning environment into the classrooms in a Computer Engineering course will be described. This learning platform is targeted as an effective communication medium between the professor and the students, in an attempt to enhance the quality of the learning process.

## BACKGROUND

### The Computer Engineering Course at NTU

The Computer Engineering course at Nanyang Technological University (NTU) is a 4-year direct honours degree program. Students will have to read subjects such as Electronics, Engineering Mathematics, Programming, Algorithms, etc., in their lower years and achieve specialization in their final year in such areas as Embedded Systems, Computer and Communication Networks, Computer Vision and Graphics, Intelligent Systems, Software Engineering, Information Management, etc. Each subject consists of 3 one-hour lecture and 1 one-hour tutorial session per week, and certain subjects have a laboratory component, which demands a two-hour session on alternate weeks. Typical class sizes are 450 for lectures, 35 for tutorials, and 35 for laboratory sessions.

## Problems in Large Class Learning

There are two key problems identified with the current large-class learning system in NTU. They are: (1) the lack of interaction; and (2) the need to be physically present in the classroom.

- **Lack of interaction:** The education community has long discussed the challenges of facilitating student-instructor interaction in large classes (Geske, 1992; Gleason, 1986). Several primary factors that inhibit student initiated interaction in large classes are feedback lag, student apprehension, and single-speaker paradigm (Anderson et al., 2003). The current learning systems are mostly one-way communication, in which the professor is giving lectures to hundreds of students in a class (Barajas et al., 1998). Even in a tutorial or laboratory session, there is seldom feedback, comments or questions arise during classes. As a consequence to the one-to-many relationship between the professor and the students, there is lack of interaction between the students and the professor (Miner, 1992; Mortera-Gutiérrez, 2002)
- **The need to be physically present:** Distance learning is the main model where the need to be physically present can be eliminated (Brown, 2001; Bullen, 1998). In this model, there is the opportunity for student-to-student interactions and student-to-instructor interaction and the faculty do not change their role significantly from the traditional classroom, although presentations will have to adapt to the technology used (Andronico et al., 2004). However, in the ordinary classroom learning model, a student may be, say, 10 minutes late for a class, and that might cause the student to have difficulty following the rest of the lecture. So it will be desirable to apply the distance learning model to this scenario so

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