MANY TO ONE: USING THE MOBILE PHONE TO INTERACT WITH LARGE CLASSES

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The perennial issue of communicating effectively with large classes can be solved using student’s mobile phones, and a restructuring of the lecture format to include communications from the students. In this talk, I’ll describe a piece of software designed to facilitate this communication. The students send a text message, which appears on the screen behind the lecturer, facilitating communication between lecturer and students. Students’ responses to the initial pilot have been very positive, but feedback is needed to advance the application beyond the beta phase.

A Problem

The perennial problem of communicating with large classes of over 100 students can be resolved using the students mobile phones and a piece of software written to take advantage of the ubiquity of the mobile phone. This paper describes the first steps towards one possible resolution. Several methods exist which allow students to communicate with lecturers in large groups, but none, to my knowledge, combine ease of use, speed of transmission, and student feedback in such a cost effective manner as the one described below.

In lectures which use this application, students can send anonymous text messages to the phone number displayed in the application, and each student in the class can see the results of the communication, because the results of the text message output on the screen behind the lecturer, when the lecturer chooses to release the messages to the screen. This represents a new communication channel between the Many (students) and the One (lecturer). It facilitates student interaction within the class, and with the lecturer, and allows the lecturer to respond to student observations, questions and comments in a controlled manner in a large class.

The lecturer must therefore adapt their lecture to take advantage of the ability of students to communicate anonymously and in real time with them.

The main area examined in the pilot module within which the application was introduced for the first time was multiple choice questions at the end of each lecture, designed to give students experience of the type of questions they might see in a final exam. This incentivized students to answer questions using their mobile...
phones, both to see the answers, and to see how the answers were arrived at in class.

Another area in which lectures have been adapted previously is mini summaries. Through an hour-long class, the results and derivations of one twenty-minutes segment would be summarized and elaborated upon, before moving to a successive topic or example. In this ‘break period, students were encouraged to text in questions, comments, or observations. Some of these texts were revealing, insightful, and often funny, which lightened the atmosphere in the class, and made it more interesting and interactive for the lecturer at the same time. The application is far from perfect, however. The application is java-based, so it will work on any platform, though at the time of writing, the application supports only one model of mobile phone, the Sony Ericsson W200i. Further areas of development will focus on

1. Improving overall application stability, compatibility, and usability;
2. Creating a statistical package to analyze responses graphically;
3. Making a web version of the application accessible through a browser;
4. Allowing ‘free for all texting if the lecturer wishes it as opposed to the ‘process staggered texting the application currently allows;
5. Allowing students to send pictures to the screen.

This short note is laid out as follows: section 2 describes the pedagogical approach to the development of the application. Section 3 describes the applications implementation. Section 4 discusses the results of a pilot module which used the application, and section 5 concludes with areas for further work.

Pedagogy

Communication with large groups is a persistent issue in university teaching. It is difficult to judge whether students are learning within the lecture format, and if they do not, no immediate student feedback is forthcoming. Possible solutions to this Many to One problem have been mooted, for example, (ABC, and references therein). Several technical solutions also exist to communicate with students but they are in general costly, proprietary, and force the students to learn a new interface.

7 http://www.einstruction.com/ is an example.
8 http://www.qwizdom.com/ is another.
9 http://www.educue.com/ reviews all educational software in this vein.
The application described here currently performs a single task: it allows the student to interact with the lecturer through a mobile phone, which every modern student has, and knows how to use, so no learning barrier exists with this technology. No costly hardware is required, because the interface is the students phone. The only barrier to communication between the lecturer and the student is the negligible mobile phone tariff.

Pedagogically, the interface allows lecturers access to instant feedback on their material, and gives the students some purchase over the direction of the lecture. The more students buy into the lecture through participation, the less passive they will feel during the lecture itself. The idea for the application arose from seeing text messages displayed at concerts and in large venues.

The technologies used in the projection of text messages in this way essentially convert the SMS text sent by the user to an email, which is delivered via a web service to the inbox of the person paying for the service, say the concert organiser. They then transfer the text in the email onto a screen reader, which displays the text for the viewers to see. This method is complex, slow (in terms of a one or two hour lecture), and expensive, and so was deemed unsatisfactory.

The lecture itself must be modified as well, as students sending texts will interrupt the flow of the lecture otherwise. It is important to strike a balance between exposition and replying to student comments and questions. Breaks must be scheduled within the lecture to take account of the feedback, and, at the end of the lecture, a summary set of questions, prompted perhaps with reference to an exam or important policy topic, should be included to allow the students time to be used optimally, while allowing the lecturer to deliver their material.

For example, in a lecture on macroeconomics, specifically business cycles, first the context is given for the existence of business cycles, and a story is told about the waxing and waning of national economic output over a business cycle. Concrete country-level examples are given with reference to a series of policy responses. This normally takes about twenty minutes.

A short recapitulation of the main points allows students to question what they have just heard, and gives the lecturer time to read and respond to text messages sent during the first twenty minutes in a batch. A model is then derived to explain business cycle fluctuations, with another recap. Finally, some multiple-choice questions are shown. Students have the opportunity to attempt these questions, and respond to them, before seeing the answers derived. The next section describes the implementation of the application.
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Implementation

The application is written in Java and bundled as a .exe file for Windows. The computer is connected to the phone via a USB cable, and the computer is attached to a projector, capable of showing the window of the application on a screen large enough for several hundred students to see. The applications workflow looks like figure 1.

The window, which students see at the time of writing on the projector, is shown in figure 2.

Students can see who sent the message (though the phone numbers do not have identifying tags), and the lecturer can process students messages either continuously or in batches. At present, no summary statistics or other types of measures can be taken from the application, which is an area to be worked on in its development. The next section details the results of a pilot module on intermediate macroeconomics where the application was tested.

Experiences using the application in a classroom

At first, students were quite skeptical about using their phones to send messages to a lecturer, but this changed once they realized all their comments would respond to in an open minded way.

The issue of control of the flow of messages became apparent early on in the lectures, so a ‘process button was added to stop a free-for-all of texting in the lecture, and allow the class to focus on lecture content.

Feedback generally fell into two categories: firstly procedural or definitional queries such as ‘can you write more clearly or ‘will there be negative marking on the exam?. Secondly, students sent texts with questions of economic theory or policy, which changed the direction of the lecture. For example, when talking about money demand, a student sent a question about Zimbabwean inflation soaring at 160,000%, and asked how to stop it. This derailed the lecture, but it encouraged students to think about the problem, and later that day a new lecture group had been formed around the issue of inflation.

So far the text messaging system has been used to show Prisoner’s Dilemma games in action, conduct large scale statistical exercises with the students, show how to answer multiple choice questions, perform a ‘hot or not’ asymmetric information game, and generate an asset price bubble in class.

Negative aspects of the process were the long setup times in each lecture actually getting the application to work with the
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phone, and overcoming student reticence to communicate in lectures. Most of the time, once the students were aware their comments would be shown, and responded to without judgment, the comments were germane, thoughtful, and informative. One issue to be resolved is the matter of cost. Students pay their networks tariff to give feedback to the lecturer, so lowering the cost barrier as much as possible should help increase feedback in lectures.

Discussion & Further Work

The application and the lecture process it underpins are still in progress. Many areas of the project are under-developed. In particular, the application supports only one phone, the Sony Ericsson W200i.

Further areas of development will focus on:

Improving overall application stability, compatibility, and usability
The application is clunky and unfinished, and lacks support and stability. Further development should increase the ‘professional, graphical user, aspect of the application.

Creating a simple statistical package to analyse responses graphically
This application can be used as a research tool if the appropriate text message storage system and data analysis components are added to it.

Making a web version of the application accessible through a browser
The goal of this application is to increase many to one interaction in large classes anywhere in the world with any phone. A browser plugin would achieve this open source ubiquity much more quickly than a desktop client. Allowing ‘free for all texting if the lecturer wishes it as opposed to the ‘process staggered texting the application currently allows. Some lecturers might want a stream of comments coming from their class on different topics, so the ability to toggle a stream of comments rather than a discrete batch as is currently the case would be a nice option.

Allowing students to send pictures to the screen Currently only SMS text messaging is supported. If MMS text messaging could be brought it, it would be potentially very useful for different lecturers.