Developing a SMS-based classroom interaction system

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Agenda

► Motivation
► Objective
► Theoretical Background
► The TXT-2-LRN System
► The Trial
► Results
► Conclusions
► Future Research
Motivation

► Classroom interactivity has a number of significant benefits:
  ▪ it promotes an active learning environment,
  ▪ provides greater feedback for lecturers,
  ▪ increases student motivation,
  ▪ enables a learning community.

► Interactive activities for large classes (over 100 students) have proven to be quite difficult and, often, inefficient.

► The rapid proliferation of mobile devices, particularly cellular phones, in the student demographic has changed the levels of student access to ICT in the classroom - presenting an extraordinary opportunity to develop interactive classroom systems and to enhance students’ learning experience.

► The present challenge for researchers is to go beyond anecdotal perceptions and obtain empirical evidence about the impact of these technologies in the classroom.
Objective

► This paper aims to describe the development of a classroom interaction system as well as to understand the impact that mobile applications such as short-message-services (SMS) can have on students’ learning experience.
Theoretical Background

Positive effects of Classroom Feedback Systems (CFS)
- improved understanding of important concepts
- increased student engagement and participation
- improved quality of discussion in the classroom
- better teacher awareness of student difficulties

Using CFS technology without specific pedagogical changes appears to have no benefit on measured student performance and learning outcomes.

Mobile Phones v.s. Laptops, PDAs and “Clickers”
Basic Assumptions:
- Nowadays most students have a SMS enabled mobile phone and that they bring it to the classroom.
- Most of the necessary ICT infrastructure for a classroom interaction system is already in place.

What we need to do?
- Enable the instructor to receive messages from students while lecturing
- A very simple solution
Classroom Dynamics

► Open Channel
- it allows students to send questions or comments to the instructor’s laptop via SMS without interrupting the class. The instructor was able to read the messages on the laptop screen and decide whether or when would be appropriate to comment on the message received. Replies to questions that were not addressed during class could then be supplied by the instructor afterwards via SMS or a traditional discussion forum.

► M-quiz
- during the class, the instructor presented a slide containing a question related to the topic and four options (A, B, C, D). Students discussed the question and were then able to use their mobile phones to cast votes and were able to see on the projector screen real-time graphics showing the results. This feature is used mainly for concept tests or to trigger class discussions.
TXT-2-LRN Classroom Interaction System

Open Channel

If you have any questions during the lectures........

- You can raise your hand

or.....

Text to your question to 021 11 84 837

M-Quiz!!!!

- In your opinion, is it important for today's businesses to manage information effectively?
  - A - Very Important
  - B - Important
  - C - Not sure/Don't know
  - D - Not Important

Text your answer A, B, C or D to 021 1184 837
<table>
<thead>
<tr>
<th>S. I</th>
<th>From</th>
<th>Text</th>
<th>Time</th>
<th>Account</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>+6...</td>
<td>how to determine whether online selling and buying is secure enough?</td>
<td>13/04/2005 4:30:49 p.m.</td>
<td>IMEI: 350€</td>
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<td>2</td>
<td>+6...</td>
<td>Is e-buisness suitable for all organisations?</td>
<td>13/04/2005 4:32:14 p.m.</td>
<td>IMEI: 350€</td>
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<td>3</td>
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<td>What was that web site?</td>
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FCOM110 is a mandatory course for all (BCA) students – approximately 1,200 students are enrolled in this course.

One-hour lectures are delivered three times a week to four groups of approximately 300 students.

In April 2005, during the five lectures on information technology, students were introduced to the TXT-2-LRN system and actively encouraged to use their mobile phones in class.

During the trial, using the system was voluntary and students paid for their own messages.

At the end of the fifth lecture, 600 students were randomly selected to answer a survey containing 22 questions exploring mobile phone usage, perceived usefulness of the system, and perceived impact on students’ learning experience.

The questionnaire was developed in conjunction with UTDC and it received face and content validation.

569 valid questionnaires were returned.
Results – Profile & Phone Usage

► Profile
  - 52.7% female, 47.3% male
  - mostly aged between 18 and 22 years (72.9%)
  - predominantly in their first year of studies (68%)
  - mainly native English speakers (64%)
  - 79.3% attended more than four out of the five lectures involving the trial

► Mobile Phone Usage
  - 96.8% owned a phone that they often carried in classes.
  - 64.9% sent more than 14 messages per week
  - Average spending $35 per month
  - Vodafone’s market share was slightly greater (54.5%)
  - The majority of students (82.8%) used pre-paid cards
Results – Open Channel

- During the trial, approximately 25% of the students used the open channel to send a question or comment in classes.
- Over 90% perceived that the ability to send the instructor SMS’s during class was useful.
- The instructor had a very positive experience
  - overall gain in quality and quantity of student feedback during class
  - the number of comments and questions received via the system (about 15 per class) was valuable without being disruptive.
- Approximately 130 students at some point of time during the five lectures actively contributed with comments and questions.
- Students indicated their reasons for not using the open channel:
  - 42.5% had nothing to say
  - 33.6% gave cost as the main inhibiting factor
  - 4.6% believed it to be distracting
  - We found a highly significant dependence between cost as an inhibiting factor for using the open channel and the students’ mobile phone operator.
- 40% of the Vodafone subscribers indicated cost was a factor compared to 26% of Telecom subscribers (Chi2 = 13.96, df = 4, 1-p = 99.26).
Results – M- Quiz

► Most of the students who used the open channel also participated in the M-Quizzes.
► More than half of the students entered at least one M-Quiz.
► 80% of the students perceived that the M-Quizzes were useful.
► The instructor noticed that this activity provided several benefits for the classroom environment:
  ▪ instantaneous feedback on concept tests
  ▪ using results to stimulate class discussion
  ▪ students seemed to be very interested in the result of polls that reflected their collective opinion on a given issue
► Student participation was mainly inhibited by cost (55%) and lack of interest (20.7%).
► A small number of Telecom NZ users also reported having some issues regarding network availability.
### Results – Student’s Experience

<table>
<thead>
<tr>
<th>Questions</th>
<th>Mean</th>
<th>Sd</th>
<th>Rank</th>
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<tbody>
<tr>
<td>Using txt messages increased the levels of interaction in class.</td>
<td>4.05</td>
<td>1.02</td>
<td>1</td>
</tr>
<tr>
<td>Using txt messages during class made the classes more interesting.</td>
<td>4.04</td>
<td>1.00</td>
<td>2</td>
</tr>
<tr>
<td>Using txt messages in the classroom is a good idea.</td>
<td>3.83</td>
<td>1.06</td>
<td>3</td>
</tr>
<tr>
<td>I found this interaction method effective.</td>
<td>3.76</td>
<td>1.03</td>
<td>4</td>
</tr>
<tr>
<td>In general, I liked using txt facilities as part of this course.</td>
<td>3.67</td>
<td>1.10</td>
<td>5</td>
</tr>
<tr>
<td>I would like to see more use of txt facilities to assist my studies.</td>
<td>3.67</td>
<td>1.09</td>
<td>5</td>
</tr>
<tr>
<td>The use of txt messages during class increased my interest in the subject.</td>
<td>3.58</td>
<td>1.06</td>
<td>6</td>
</tr>
<tr>
<td>The use of txt messages during class enhanced my study.</td>
<td>2.95</td>
<td>1.01</td>
<td>7</td>
</tr>
</tbody>
</table>
Gender, age, year of study, mobile phone usage did not present any significant dependence.

Students’ native language not being English was a significant variable.
- Surprisingly, native English speakers had a significantly more positive overall perception of the system than the ESL counterparts.

74.8% believed that it should be used mostly in large classes.
Conclusions

- Students and lecturer did benefit from the additional channel of communication in the classroom.
- The “open channel” was found to be a more efficient method of communication than “raising hands”.
- The lecturer perceived a gain of quality and quantity of feedback from the students.
- Students perceived the system to be useful - making classes more interesting, increasing interest in the subject and enhancing their learning experience.
- The “open channel” was found to be an especially useful, efficient and preferred method of communication, in comparison to the traditional “raising hands” method of asking questions.
- While students perceived only a moderately positive impact of the system in terms of increasing their interest in the subject and enhancing their study, they indicated that they would like to see more use of this technology in the classroom.
- Overall, the main inhibitor for adoption of SMS in the classroom was the cost of text messages, rather than a perception of the systems value.
- Recent changes in the pricing structures offered for SMS services should see the cost barrier further reduced, increasing the usage of the system in the classroom.
Future Research

► Students’ performance and learning outcomes versus use of the system
► Longitudinal studies
► Different contexts and disciplines
► Activities outside the classroom should be investigated in order to extend the boundaries of the classroom through mobile technologies.
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