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Use of Mobile Phone Technologies in the Classroom Context

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Abstract

This study investigates the use of mobile phone technologies in classroom interaction. Classroom interaction promotes active learning and enhances the student experience. We make an overview of current classroom mobile interactive technologies, discuss experiments with three different systems and evaluate these experiments.

1. Introduction

This study investigates issues raised by the use of mobile phone technologies in classroom settings. Experiments with SMS and web based systems used in lectures are considered and evaluated.

The most common way of delivering teaching materials to a large group of students is through a lecture. Although this is widely used and a cost effective way for teaching students at universities, students often participate only passively by listening or taking notes. It is well known that people retain most knowledge if they actively participate in the learning process by doing an activity and applying the concept presented to an appropriate problem.

Using interactive classroom pedagogies in large classes is not trivial and requires a lot of effort from the lecturer (Freeman & Blayney, 2005). Classroom interaction in the form of asking questions, gathering answers and giving feedback, and/or role play during a seminar/lecture session enhances the students' learning by improving their attention and giving them an opportunity for reflection on the content presented (Ruhl & Suritsky, 1995), (Waite et al., 2003). It also promotes an active learning environment, provides feedback for the lecturer to constructively align the learning and teaching approaches with the expected learning outcomes, and increases students' motivation (Bär, Rößling & Tews, 2006).

Mobile technologies offer capabilities that can support classroom work via web or SMS based systems. The web based systems can be used by other mobile wireless devices such as notebooks or PDAs. However, modern mobile phones have similar capabilities, and they are less costly and more ubiquitous.

1.1. Overview of related studies

In recent years there has been considerable interest among educators in finding ways of integrating mobile and wireless technologies in learning and teaching. There have been a number of systems developed and tried using mobile phones in support of classroom interaction.

A so called “TV remote” (Bär, Rößling and Tews, 2006) system offers a solution for supporting interaction in class through mobile phones using Bluetooth connections, with no transmission costs incurred by students. Some of the drawbacks of this system include complicated implementation and limitations of the Bluetooth technology, such as much lower data transfer rates compared to other wireless communication technologies.

Other studies use SMS/MMS in classroom interaction systems (Lindquist, Denning, Kelly, Malani, Griswold and Simon, 2007; Markett, Sánchez, Weber and Tangney, 2004; Scornavacca & Marshall, 2007). These systems promote active learning in the classroom by giving opportunity to the students to send SMS/MMS messages in the form of comments, questions or multiple choice-questions. However, one major issue with these systems is the cost of SMS/MMS, which may prevent their wide adoption, especially from the students’ point of view. Another problem is the aggregation of the messages and their interpretation in real time by the lecturer.

There are other types of interactive systems, such as ‘Turning Point Interactive Response Systems’ (TPIRS), e.g. www.misco.co.uk, typically used for interaction with a TV audience during a quiz show. This system integrates well into almost any environment and gives instant user feedback for any electronic presentation. However, there is a high initial cost of acquiring such a system and restricted flexibility.

2. Experiments and evaluation of SMS and web based systems

2.1. SMS – Edutxt system

“Edutxt” (www.txttools.co.uk) is an online application developed and supported by texttools.co.uk which allows the sending and receiving of SMS text messages from a desktop to a large group or single mobile phone instantly. “Edutxt” has been used in a large number of colleges and universities across the UK to support marketing, recruitment, student services, learning and teaching. “Edutxt” was introduced to students in a lecture session for “Information Systems Modelling and Design”. The students were asked to submit answers to three multiple choice questions via SMS at the end of a lecture session. The students were also encouraged to use the “Edutxt” to submit comments, suggestions and questions related to the module. Although a preliminary survey (Arreymbi & Draganova, 2008) has indicated that students are positive about the use of the mobile phones in learning and teaching, only very few took part in this experiment. However, the students commented that they like to have the option to send a text message to the tutor about the module. Some students used the system to send questions related to the submission of the assignment and comments related to the tutorials. The main benefit of using “Edutxt” is its inclusiveness, i.e. providing the option to students to actively participate in the session by answering/submitting questions or submitting feedback. The lecturer can address some of the submitted answers/questions/feedback immediately or in subsequent sessions using the relevant interface.

2.2. UEL uHavePassed system

“UELuHavePassed” is a Java application for mobile phones developed by Luzia research (luziaresearch.com). The application allows the lecturer to upload question banks and make it available for download and installation to the students. Once installed students can practice the questions and use it as a formative type of assessment. “UELuHavePassed” consists of approximately 80 multiple choice questions from different topics related to the module “Information Systems Modelling and Design”. The main benefit of this system being mobile is that it can be used at any time and any place. Therefore students can practice when they are on the move and want to utilise this time for study. Moreover, the system provides instant feedback to each question, it is cost free for the students and it is suitable for the majority of students’ mobile phone devices. However, “UELuHavePassed” is more appropriate to support independent study rather than classroom interaction. The students, who downloaded the application, have given positive feedback of using it.

2.3. On-line intelligent multiple choice questions system

The possibility of using web applications to support classroom interaction is another viable option. In many university campuses, WiFi networks are available and students can use free broadband connections on their mobile phones. This makes it possible to have web applications that implement mobile services related to classroom interaction. Such solutions offer free-of-cost connections and make use of the modern capabilities of mobile phone devices.

It is also possible to automatically collate students’ messages and to make intelligent interpretation of the students’ answers. Having such capabilities in a system would enable sending appropriate automatic individual feedback to the students’ mobile phones and providing the teacher with an idea of the students’ misunderstandings (Lee, Palmer-Brown and Draganova, 2008).

We have developed an on-line self-assessment system, which incorporates a neural network model that categorises the learner's responses as having a significant level of similarity with a subset of answers it has previously categorised. Each category is associated with feedback composed by the lecturer on the basis of the level of understanding and predominant misconceptions of that category-group of answers. In this way the feedback addresses the level of knowledge of the individual and guides them towards a greater understanding of particular concepts. This approach allows capturing the data that is generated by the students when they attempt on-line formative assessments, which can provide lecturers with a detailed picture of the learning of their students. Since this system is accessible via the web it can be utilised in classroom sessions settings to support interaction and active participation, provided students have mobile devices with WiFi capabilities, or another type of web connection. It will also make it possible for students to use the system at any location to support their learning. The next stage in this study is to modify the interface of the system described here in order to make it more accessible via a small screen on a mobile phone or device.

3. Conclusion

The pilot experiments carried out in this study demonstrate the potential of three real systems for supporting learning and teaching via mobile phone technologies in a classroom context. The students have expressed a positive attitude towards the use of these systems. “Edutxt” and the “On-line

intelligent multiple choice questions system” compared to classroom response systems are more ubiquitous since they are based on mobile phone and internet technologies. These systems do not require the installation of additional devices or systems in the classroom and they can also be used in face-to-face sessions taking place outside a classroom. Although the experiments that have been carried out in this study relate mainly to multiple choice assessments, the systems can be used for other interactive classroom activities. For example, “Edutxt” offer the possibility of submitting free text questions or comments, instantly sending messages to a large group of students and, in general, adding an additional channel of communication between the lecturer and the students. The “On-line intelligent multiple choice questions system”, which is a web-application can be extended to include similar functionalities to “Edutxt” with the added benefit of automation in collating and manipulating the student answers and comments.

Moving towards wider application and objective evaluation of the trailed systems is the next stage of this project.

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