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How to cite:

Shishah, Wesam; Hopkins, Gail; FitzGerald, Elizabeth and Higgins, Colin (2013). Supporting interaction in learning activities using mobile devices in higher education. In: QScience Proceedings, 35.

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Version: Version of Record

Link(s) to article on publisher's website:

<http://dx.doi.org/doi:10.5339/qproc.2013.mlearn.35>

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Supporting Interaction in Learning Activities Using Mobile Devices in Higher Education

Wesam Shishah¹

Gail Hopkins¹

Elizabeth FitzGerald²

Colin Higgins¹

¹School of Computer Science,
University of Nottingham, Wollaton Road,
Nottingham, UK. NG8 1BB

²Institute of Educational Technology,
The Open University, Walton Hall,
Milton Keynes, UK. MK7 6AA

(psxws, gail.hopkins, colin.higgins) @nottingham.ac.uk, elizabeth.fitzgerald@open.ac.uk

ABSTRACT

Mobile devices are personal, portable and being increasingly used to assist students' learning that creates new educational opportunities for students at university. Adopting mobile technologies to various educational activities that students are practicing in Higher Education (HE) is a key challenge yet one that could create powerful opportunities to support academic learning. This research will investigate how students at university use mobile devices with respect to engagement and interaction in various learning activities. It will study how students in HE engage with learning tasks and what social interactions occur when they are trying to achieve their academic goals. Also, the tools/software that support their academic goals in different learning settings or activities will be considered. This paper shows the background of the research to promote students' interaction in various learning settings (including both different physical environments and different activities) using mobile learning support system.

Author Keywords

Interaction, Learning activities, Mobile devices, HCI, Higher Education.

INTRODUCTION

Mobile learning has emerged in recent years to become a major research area in the field of teaching and learning. In Higher Education, several studies have been conducted to understand university students' experiences and attitudes towards using mobile devices for academic purposes (Holley, 2010; Qudah et al., 2013).

Student interaction plays a significant role in Higher Education and studies have demonstrated a link between students' social interaction with the academic environment and positive academic achievement (Robbins et al., 2004). Educators have shown considerable interest in discovering methods of integrating mobile and wireless technologies into teaching and learning in recent years. Various systems have been developed, which use mobile devices to enhance students' interaction and engagement in lectures (Ayu et al., 2009), instructor experience and feedback (Dino and Scott, 2011) and communication in lectures (Scornavacca et al., 2009).

This PhD research will investigate the opportunities provided by mobile devices in supporting social interaction in different academic settings for Higher Education students. The research will focus on how mobile devices can support and enhance engagement and interaction with learning material in traditional lectures, online lectures, computer labs and group-work. The research is in its early stages of understanding the activities that take place in different university teaching and learning environments and the use of mobile devices within those settings. Ultimately the aim of this PhD is to design a mobile academic support environment that helps students' engagement and interaction with various learning activities in a range of different physical settings.

RELATED WORK

Mobile devices promoting Interaction in HE

A number of researchers studied the use of SMS/MMS in classroom interaction systems, including (Henderson-Begg et al., 2009; Lindquist et al., 2007; Markett, 2004; Scornavacca and Marshall, 2007). Active learning in the classroom is promoted by encouraging students to send comments, questions or multiple-choice questions, such as SMS/MMS messages. This provision was found to encourage the participation of shy or self-conscious students, enhancing the interaction between the learner and content, encouraging student interaction, as well as promoting classroom accountability (Markett et al., 2006). Some disadvantages remain, such as the cost of SMS/MMS, which may prevent this approach being adopted widely, and particularly from students' viewpoint, the aggregation of the messages by the lecturer, and their interpretation in real time (Draganova, 2009).

Audience Response Systems (ARS) were improved by (Ayu et al., 2009) by removing the necessity of specialist infrastructure by replacing clickers with mobile phones, and providing a web-based interface. Responses are made by dialling a predefined number to provide a particular response. Responses can use alternative methods such as web voting

or SMS, which is usually free. The support for this approach is indicated by a pilot system as reported in Ayu et al., 2009, which had 21,000 voters that voted 92,000 times in 14,000 surveys.

The development and testing of a mobile productivity tool, SHERPA, designed for use by both students and teachers in the classroom, has been undertaken by Schweitzer and Teel (2011). SHERPA is designed to assist teachers with various administrative classroom tasks, as well as allowing for communication between colleagues. The tool's functionality includes interaction with the teacher, as well as with other students, arranging collaborative meetings, as well as providing feedback from lectures. SHERPA is based upon cloud computing architecture and allows for the sharing of information between teachers who have students in common.

MOTIVATION

Most students at university own one or more mobile computing devices, including a smartphone, laptop or tablet, as observed by the principal author. Students need to engage in different learning activities and in different settings such as asking questions during lectures, collaboration in group work, discussion in online forums, working in labs and individual work on assignments. E-learning technologies are becoming more widespread and, as such different tools and technologies are used in universities to encourage interaction and engagement between students and with instructors. Universities often encourage social interaction during learning activities by providing students with tools such as discussion forums as well as utilizing more ubiquitous technologies such as social networking sites. Currently researchers are investigating how mobile technologies can be used to provide support for learning but there is limited evidence to demonstrate how mobile devices can be used to encourage engagement and interaction across different teaching and learning settings. It is proposed that mobile technologies can offer a valuable resource for use in these different environments and this PhD research aims to focus on how this can be achieved.

RESEARCH QUESTION

The overarching research question proposed in this work is as follows: how can mobile devices be used across different students' learning environments (lectures, labs and group work) to promote engagement and interaction in the learning process?

Secondary research questions aim to explore issues around socio-cultural issues around engagement or lack of, including e.g. English language skills, shyness/confidence in interactions with fellow students and also with staff, and cultural norms amongst a diverse student population (e.g. those encountered when working with international students).

METHODOLOGY

A mixed method approach will be taken to investigate which mobile devices are currently used in the learning environment and how they are used. Observations, questionnaires and focus groups will be used in order to:

- Identify the current tools that are used by students and staff in different learning environments to support students' learning and related social interactions
- Understand how students interact with their existing mobile devices within learning environments
- Examine attitudes towards the use of mobile devices in the learning environment by students and staff
- Identify factors (technical, social, cultural, etc.) that could reduce or enhance student interaction in learning environments

When the phases above are completed, we aim to have two main findings. Firstly, we will have a thorough understanding of what the current situation is with respect to mobile devices/software/apps and how students and staff currently exploit them for learning in different HE learning activities. Secondly, we will be able to see where the gaps are in terms of supporting staff and students in these activities. This will result in a requirements gathering exercise, to find out what staff and student needs are, in terms of providing a mobile academic support system. These requirements will lead to the design and development of a prototype mobile system, which will be trialled in at least two different activities (e.g. lectures, group work) and evaluated for its effectiveness, targeting those activities where support for student learning is currently lacking the most.

The theoretical underpinning is currently still being explored but we expect to draw upon theories of learning space (Pearshouse et al., 2009), Luckin's ecology of resources framework (Luckin, 2008) and also activity theory to frame the conceptual aspects of this work. (Baloch et al., 2012; Engestro, 2001; Engeström, 1999; Li and Bratt, 2004; Uden, 2007; Zurita and Nussbaum, 2007)

CONCLUSION AND FUTURE WORK

This paper provides with the background of the research that will investigate into support social interaction with several learning activities in Higher Education using mobile academic support system. It has explained the motivation of the

research and the methodologies and plan of work to be undertaken. The current stage of the research is focusing initially on lectures, by collecting data to understand interaction between and within students and staff with learning activities in lectures and the tools/software and mobile devices utilised to support these interactions.

The next stage of this research will focus on a group work setting, with emphasis on students' social interactions and tools/software and mobile devices that could support both staff and student engagement under this setting. Ultimately, as mentioned above, the goal of this stage of the work is to develop a requirements analysis to inform the design and development of a mobile solution as a means for enhancing interaction and engagement in learning activities by both students and staff, taking place within a Higher Education environment.

ACKNOWLEDGMENTS

We would like to thank all of the students and lecturers in the University of Nottingham who participated in our studies. This research is supported by the Ministry of Education in Saudi Arabia.

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