Project Proposal

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1 Principle investigator

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2 Project title

The proposed project title is:
A lecture comprehension indication system

3 Statement of the problem

As it stands, lecturers are often unaware of how well students are grasping concepts in a lecture. This is because there is often not a large amount of engagement by students during the class. Students rarely have the confidence to ask questions, ask a lecturer to slow down, repeat something or explain a topic further when they are unsure of the subject matter. To remedy this problem, it would be beneficial for lecturers to have a system which could inform them of how well the students are understanding what is being taught as well as whether they are content, engaged, bored or just have something that they would like to say. Many students at Rhodes fill in student feedback questionnaires towards the end of a semester for a range of subjects. According to Kember et al.[1], these questionnaires are used to improve the quality of the education. Educators can note their faults in teaching through these questionnaires and can make improvements to their teaching styles to address these faults. This should result

in a better quality education and learning experience. It is also sometimes seen as an obligation by university administrators to gain the opinions of students. The problem is, this is just hypothetical and according to Kember et al. [1], there is no evidence to prove that these questionnaires actually help or make any contribution to overall learning or education quality. Another issue is that the students are offering feedback on their experience of the course at the end and so, the knowledge the lecturer gains from the feedback can only be used the next time s/he lectures. This does not benefit the class that gives that feedback, only the next group of students. As a result, it would be much more beneficial for lecturers to receive real time feedback from the students. This can be done by means of a lecture comprehension system which can be created in a variety of ways.

4 Objective of the research

Based on the aforementioned problem, the objective of the research would be to create a lecture comprehension system using a mobile-web based or Android based application where students can give lecturers feedback from anywhere, including the lecture venue, at any time during the course, instead of just at the end [2] . This system will be live and lecture-specific so that lecturers are immediately aware when students are struggling with a concept or have strong feelings about the lecture; the students will be able to send in feedback via their mobile phone during the lecture and the lecturer will receive it immediately. The lecturer can then address the problem right away. According to Zhan et al. [3] this method of system-student interaction is much more convenient for instructors to view student's queries. This is because as mentioned earlier, students can lack the confidence to ask the instructors questions or for help during lectures, learners can be insecure about their level of understanding, instructors do not have a thorough understanding of the level of understanding of the students, and test results are often not returned in time. [3]. After a trial implementation, the opinions of lecturers and students will then be recorded and analysed to see if they believe that the system is a useful tool and whether they think it is valuable.

5 History and Background

E-learning is the use of technology and electronic equipment to aid in the process and execution of education [4, pp. 1]. It is at the forefront of education and it is the way that education is changing. e-Commerce and e-Business are commonly spoken about but e-learning is becoming an increasingly used term in business as it is a good investment[4, pp. VIII]. In academia, higher education is now faced with the problem of competition. This competition is local and global and so Universities need to stay up to date with educational methods.[5] According to Jones et al. (2009) [5] e-learning supports a student orientated learning

model and it helps support the current changes in education. E-learning is also encouraging collaboration and symbiosis amongst different professional groups. This increases the respect and understanding of the different groups. It has proven to enrich and improve the development of courses. [5]

There are two types of e-learning that are commonly recognized; namely asynchronous and synchronous. Asynchronous e-learning is performed when participants cannot communicate at the same time. Asynchronous e-learning provides flexibility as it allows students to use resources at any time as their use is not stipulated by time constraints. For example, common synchronous methods are e-mail, forums, recorded lectures and discussion boards. In comparison, synchronous e-learning is performed in real-time. Synchronous e-learning can reduce frustration as questions and answers can be asked and answered immediately. If there is not a noticeable time-delay between participants, then the learning is said to be synchronous.[6] Examples of synchronous e-learning are videoconferencing, LVCs(live virtual classrooms) and live chat.

E-learning does have some limitations: Not all types of training and education work well with technology as the main medium. According to Maldonado(2011) [7], it is very important to have motivation from lecturers, parents and peers to learn; due to the fact that a large proportion of e-learning uses are based on autodidacticism: self-motivated learning, students who cannot motivate themselves struggle to use e-learning effectively. E-learning also cannot replace learning where face-to-face interaction is necessary. However technology is changing, and so the scope of e-learning and how we can use technology to support learning is also changing [4, pp. 2]. There are many benefits of e-learning as intranets and the Internet provide students with forms of learning that they previously would have had to travel to receive; learning can therefore take place in one's home whenever the necessity arises. Streaming multimedia makes learning much more engaging and the fact that students are allowed to take courses from universities and schools that are at a distant location from them adds great flexibility [4, pp. 2].

E-learning encompasses many technology-based educational tools and this is the field in which lecture comprehension systems are situated. A lecture comprehension system is a synchronous form of e-learning technology as it is a real-time tool. Previous implementations of lecture comprehension systems, include an implementation by Zhan et al.[3], an implementation by Pohl et al.[8] and an implementation by Harry et al.[9]. At the University of Tokyo, Zhan et al's lecture comprehension system was incorporated into the traditional education system.[3] The system also incorporated real-time question sharing and auto-grouping which grouped slides that were commonly misunderstood. Lecturers could then quickly realise what topics needed more attention. The lecture comprehension system was then implemented in mock lectures and average test scores were compared. According to Zhan et al. [3], there was a statistically significant increase in the marks when a lecture comprehension system was used in comparison to when it was not. In comparison, the implementation carried out by Harry et al.[9] at MIT was during a conference and people in the audience could vote for the questions that they thought were the most relevant posted

by the audience. One unnamed participant at MIT said that the system "gave [audience members] opportunities to participate in direct ways."

6 Approach

The first phase begins with gaining more insight into e-learning and lecture comprehension systems. This will also include research into the implementation of Android[10] applications and whether Android is a viable platform for creating the student application. An understanding of and ability to create Android applications should also be gained during this phase. Research into Windows Gadgets[11] will also be performed. An understanding of how to create a Gadget and link it to the Internet will gained. A literary survey will be performed so that previous implementations of similar systems can be understood and common pitfalls avoided.

The second phase incorporates deciding what features to include in the system and how to include them. The system will then be designed and it shall be decided how the student part of the system will connect to a lecturer application.

The third phase includes creating the application using the Google App Engine [12]. A website will also be created for the lecturer so that the lecturer can receive feedback during the lecture. Seeing as lecturers often use slideshows, a Windows Gadget will be created to give a summary of the feedback from the web page. This will allow the lecturers to see a small representation of the feedback on the screen. The Gadget will be created using the Gadgets for Windows Sidebar Manifest and an HTML file. [11]The third phase also includes creating this website that the Gadget will be based on. The website will be served from a web server implementation running off a virtual machine on my Hamilton Building workstation. It will be run on Oracle VM VirtualBox and the web-server role will be created on Windows Server 2008 R2 Enterprise Edition. This allows me to customize my web-page on my own machine. Due to the fact that the implementation will only be tested for a short period of time, the effect that the virtual machine will have on my computer will not be too problematic.

The fourth and final phase focuses on testing where a class from Rhodes University will be picked and students in the class will be asked to download the application. Due to the fact that I shall be using humans as part of my research, a human ethics approval application will be submitted to the departmental ethics committee. The students will be asked to test this application for a period of time in the class and the lecturer will be asked to use the feedback part of the application to improve their lecturing. The students and lecturer can then give their opinion on the application and inform us whether it is useful or not. The feedback will be analyzed and conclusions drawn.

7 Requirements/Resources

The hardware requirements:

- A desktop computer on which the application will be created.
- A virtual machine on the desktop computer where the web-page will be hosted.
- Wifi access within a lecture venue.

The software requirements:

- Windows 7 enterprise edition
- Google App Engine SDK
- Windows Sidebar
- Windows Server 2008 R2 enterprise edition
- Oracle VM VirtualBox

Non-computer requirements

- A group of students in a class with Android mobile phones
- A willing lecturer to implement the use of the student feedback system

8 Progression time-line

Date	Event
22 February 2013	Research basis of project
1 March 2013	Formal Written Proposal
5 March 2013	Prepare and Present Project to staff
10 March 2013	Gain proficiency in Google SDK
1 May 2013	Created Application and corresponding Web page
27 May 2013	Literature Review
30 June 2013	Application tested and feedback received
30th July 2013	Seminar Series 2
5 September 2013	Draft Short Paper Submission
16 September 2013	Final Short Paper Submission
28 September 2013	First draft of thesis handed in
28 October 2013	Seminar Series 3
1 November 2013	Project Hand-in
4 November 2013	Website complete
19 or 20 November 2013	Oral on Project

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