

## **Work-package 1: Specification of a learning management system**

This document addresses the activities and roles of potential stakeholders using an mLMS. It will also describe the basic use cases for these stakeholders. The issue of device detection is also addressed.

It is the intention of this Partner to specify a mobile learning management system (mLMS) that could be bolted-on to an existing traditional learning management system. When addressing the features of an mLMS that could be added to an existing LMS, the project members examined the features of the LMS currently utilised by Ericsson – this is called TEDS.

### ***Existing features in TEDS***

- Login
- Access to courseware (in theory)
- Time independent access
- Time table of courses
- Student Evaluation of course
- Student course history
- Student List
- Invoicing
- Lecturer schedule
- Lecturer course portfolio
- Confirmation notification

The above features would be included in an existing LMS and are therefore unnecessary to list as part of the features of a mobile LMS added on to the existing LMS. These features would be integrated into the mLMS. The integration of these two systems is not addressed here as this is deemed beyond the scope of this project. Suffice to say that this is a suitably complex topic to be addressed separately. The technology used to implement the features of the mLMS listed below are implemented using Java.

### ***Additional features of an mLMS for the purposes of mLearning2 project courseware***

- Student profile
  - Homepage – Each student has a homepage available in two forms; public and private. The student's private homepage will contain information that is personal to the student – a graphic representing the student's progress within their work-plan, assignment grades etc. The public homepage is available to

all, detailing the student's contact details, photo, and course enrolment(s). This information is provided by the student at registration and entered by the administration staff.

- Work-plan – Upon first logging into the course the student will be presented with the workload for the course. This will have the form of a list of modules and the estimated time each module takes to complete, including the end of course self assessment test. Student is asked to give a time schedule for completion of all work modules. This is then submitted to the tutor for review. Automatic alarms will be sent to the student and their tutor if they are falling behind on this.
- Work plan alert – if a student is falling behind on the agreed work-plan, both student and tutor receive notification (email, SMS or MMS).
- Tutor Profile – Each Tutor has a homepage available in two forms; public and private. The Tutor's private homepage will contain information that is personal to the tutor, with private information about the students that they tutor. The tutor's private homepage contains a list of the courses that they are the tutor for. Within each course there is a list of the students that they tutor. Any messages from students including work-plan alerts and work-plan submissions will be indicated here. It is possible that they could be read elsewhere – e.g. Email account. The public homepage is available to all, detailing the tutor's contact details and photograph. This information is provided by the tutor when they enrol as tutor for the course. The tutor schedule is available on their public homepage also. This details any scheduled communication with the students e.g. conference calls. Students can request time with the tutor in this section.
- Course Profile – Each course has a homepage stating the tutor(s), the list of students attending the course with their contact details, and a high level summary of the course.
- Single sign on – this is a feature regarded as highly valuable to the perceived ease of use of any system. For students sitting more than one course, they will have a single username and password. This will become activated for a course when they register and pay for it. In this way they do not have to remember a separate password for each course, rather they have a single password for the whole system.
- Student support services
  - Student- tutor communication using a variety of messaging systems such as email, SMS, MMS, voice
  - Student –student communication
- Administration information provided to student
  - Assignment deadlines – as defined as per the student work-plan

- Registration – the student registers for the course providing personal details. These are stored in a database. Upon completion of the payment process, the administration system will send the student their username and password.
- Payment options
- Marketing information (i.e. Courses in the same or other course flows as this course)
- Storage of assignments submitted and of graded assignments- the mLMS stores the details of each student’s end of module self-assessment tests.
  - Tutor access to grade reports - tutors can see the results of the end of module self-assessment tests performed by students.
  - Student access to grade reports – students can see the results of the end of module self-assessment tests.
- Course Access
  - Enrolment – the enrolment process is performed at first login when the student sets up a workplan for the course and submits it to the tutor.
- Student Interaction – The student interaction is course specific. The course homepage contains a list of all students of this course and their contact details. This student list linked to individual student homepages. The course name will automatically be entered into the subject field of the SMS, MMS or email message when the student selects this mode of communication.
- Student Assessment – Students must score above predefined grade in end of module assessments to automatically mark the course as completed for the student. This grade is tutor configurable. Students may repeat module assessments.

In accordance with the proposals put forward by Professor Bernd Krämer in addressing the activities and roles of the potential stakeholders using an mLMS, a scenario driven approach shall now be adopted in describing an mLMS service. Professor Krämer proposes applying the following steps:

1. Identify the stakeholders
2. Identify the top-level use-cases for each stakeholder
3. Develop typical scenarios including exceptions for each use-case in terms of structured text

## **Stakeholders**

### ***Student***

The student is the person who enrolls for the course. A student will be assigned to one tutor. The student will study the course material and complete end of module self tests as a means to identify their progress through the course material

***Tutor***

A tutor is assigned to a course. A number of tutors may be assigned to the one course. Each tutor is assigned a number of students for whom they are responsible. The tutor reviews each student's progress through the course. They can send supplementary information to the students and schedule tutorials. They can also update the course homepage with course updates.

***Administration System***

The administration system describes the actions performed by administration staff, and by the administration functionality built into the mLMS that will be performed automatically

**Top-level use-cases for each stakeholder*****Student***

- Registration
- Enrolment
- Course attendance
  - Includes EOC self tests
- Communication
- EOC Evaluation

***Tutor***

- Registration
- Enrolment
- Support – the tutor can pose supplementary course materials on the mLMS for student use
- Communication
  - Includes review of work-plan when first submitted, and contacting student if the work-plan is not adhered to.

***Admin***

- Registration handling – receive student and tutor registrations
- Tutor assignment – assign tutor to course
- Student assignment – assign student to the course tutor
- Add, modify and remove course content

**Typical Scenarios**

### **Student course attendance**

- The student enters the URL of the mLMS login in their browser. They will be presented with their private home page, which has a link to all courses for which the student is registered. Upon first logging into the course the student will be presented with the workload for the course. This will take the form of a list of modules and the estimated time each module takes to complete, including the end of course self assessment test. Student is asked to give a time schedule for completion of all work modules. This is then submitted to the tutor for review. Automatic alarms will be sent to the student and their tutor if they are falling behind on this. The student may now proceed to the first module of the course. When they have completed the module they will complete an end of module self-assessment test. The results of this test are presented on the student's private home page and on the tutor's home page. The tutor may contact the student if this result is very low. The student may return to their homepage at any time. The homepage will show a graphic representing their progress in the course. When the student is finished he/she logs out of the mLMS

### **Device detection**

The first function that the mLMS will have to perform is the tailoring of the presentation of the material to each of the above listed stakeholders to the devices that they are using to access the content. There are a number of methods of performing this. When the student registers, they can register the handset that they will be using to access the course. This will be stored in the student database. A Device Capabilities file will contain in more detail the media formats and other related parameters supported by a specific terminal. When student A logs into the course, the mLMS knows that they are using handset A and a stylesheet can then be used to tailor the content to this device and return it to the student's handset.

A second method uses the UAProf, which is a more dynamic method of identifying the mobile handset requesting content from the mLMS. When any device requests a page of content from the mLMS, this request will be received as a HTTP request. This request will contain headers, one of which will identify the device make and model. This is part of the UAProf (User Agent Profile), which identifies the capabilities of the device. The mLMS can then read the appropriate Device Capabilities file which will be stored in the mLMS. This will contain in more detail, the hardware and software capabilities of this device. A stylesheet can then present the content in the HTTP response in the appropriate format. It is proposed that for the purposes of this project a combination of these two methods be used.

Another alternative method is to trust the intelligence of the Wap Proxy Gateway being used. Handsets requesting content using WSP or HTTP will send the requests via a proxy gateway. The gateway may have the intelligence to read the UAProf and tailor the content accordingly. The Ericsson WAP Proxy Gateway, called the MIEP (Mobile Internet Enabling Proxy) can perform such a task. This foregoes the necessity of implementing this functionality into the mLMS.

In all cases there is a requirement, however, for the Device Capability files to be updated as new handsets come to the market.

## **Standards**

One of the basic tenets of the “mLearning – The Next Generation of Learning” project is the promotion of strict conformance with industry standards and specifications as produced by the mobile telephony industry. The leader in the development and promotion of these standards is the Open Mobile Alliance (OMA) ([www.openmobilealliance.org](http://www.openmobilealliance.org)). Ericsson is a key member of this alliance. In the production of standards and specifications the OMA works in tandem with other significant groups of which Ericsson is also a member. Two parallel sets of standards will be adhered to in the development of the mLMS; standards produced by OMA and related bodies for mobile specific situations and standards such as SCORM for LMS related situations. This project adopts both sets of standards in both the development and supply of mlearning courseware and it is envisaged that the successful integrations of both sets of standards holds the key to the wide-scale use of mlearning as a viable additional learning medium to traditional elearning.