

Development and implementation of virtual academy for enhancement of distance learning

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1. Abstract

Who are the peoples in barriers of time and distance issues, those kinds of peoples can't achieve their expectation in education. Therefore, we have developed a system for addressing to give a great chance to learn online with more facilities with the use of server configuration. The remainder of this document describes the functional requirements of the Virtual Academy in detail, including descriptions of the individual modules, integration points between existing modules and high-level scope of new modules to be developed specifically for the Virtual Academy.

Index terms – E learning, device, classroom, Virtual, Distance, configuration, mobile, geographical

2. Introduction

Today most of the people in the world have so busy lives. Unfortunately, they cannot avoid their busy lives. Every person is really needed to get more qualifications. So, people need to get more education though they have not time to do it.

So, I am introducing an eLearning system with more facilities here. With that system the students can get the education by staying at home. The special thing is this system is fully support from the beginning to the end of the course.

That means from providing a classroom to get the certificate. Here I would like to build a system to gather all students who wants to do the same course. And then the system gathers the students who want to do the same subject. And get their free times to join to the classes and make a group with same wishes students. Then the system can assign a teacher for that classroom. From now let's say it's a virtual classroom. The teacher as well as all students can log to the virtual classroom at the class begins,

So, class goes as a normal class with teaching, questioning, discussing, assignments and all. And there can teacher-student communication, student-student communication both.

Meanwhile there the students can log to the classroom with their mobile phones too.

So, I have implemented the system for some mobile devices too. Actually we decided to provide complete solution for the above problem from my project.

3. Problem Statement

Well, it is the catalyst that is changing the whole model of learning in this century – for school pupils, university students, for employees, for the on-going training and development of professionals like doctors, nurses and teachers - in fact for just about anyone who wants to find out something on either a formal or casual basis. Here are eight ways why I think e learning is revolutionizing learning, and to illustrate them, I've included some examples of e learning freely available on the Internet.

E-Learning means that you no longer need to spend long periods travelling to a location to attend a course; you can now have access to learning when you want it, at the time you want it - day or night, wherever you want it - at home, at work, in your local library. For many students this has opened up a new, much more flexible and accessible world of learning that was previously closed to them due to disability or family circumstances, or perhaps due to the fact that the course they wanted was on the other side of the world. In Other words, there are now no longer any geographical constraints to learning; e-learning Brings learning to people, not people to learning.

E-Learning means that learning no longer needs to be a passive experience, with the learners all sitting in front of the teacher and "learning by telling", e-learning makes learning an active experience. The emphasis is on interactivity or "learning by doing". And makes learning exciting, engaging and compelling. Hard and boring Subjects can be made easier, more interesting and appealing with e learning, and is also helping to embed learning within work processes, as Organizations begin to recognize that learning is not something that only takes Place in a classroom. In fact, 70% of all learning occurs whilst a person is on the job, that is not in formal training or education but in everyday working Life as employees carry out their jobs - finding out information, reading Documents, talking to other colleagues etc. Learning has moved from the classroom onto the desktop and now into the pocket. It's a fact that we are all becoming more mobile; about 50% of all employees now spend up to 50% of their time outside the office. We all do a lot more traveling (on buses, trains and planes), as we visit other offices or campuses and there is quite a bit of evidence to show that

people would like to make more use of this "dead time" for learning purposes. The term m learning is used to describe the use of PDAs and mobile phones for learning.

The major problem is currently there is no e-learning system that integrates system to mobile device that has same functionalities included in desktop system.

4. Requirement Analysis

Basic requirement is implemented new e-learning chat client. For this client we are supposed to use free and open source chat server ejabberd.

Basic Requirements are Described below.

- Low Cost – Most important thing is system should be low cost, there for supposed to use free and open source chat server. Chat server is the application that transfers data to one user to another user also called as chat engine.
- User Management – Should be create user accounts, edit users manage permissions. This system use to facilitate e-learning therefore it should be possible to create user account for students and as well as for teachers and also this system should be able to manage and maintained by administrator account, and also able to remove user from system this is impartment when one course is finished he is no longer active user.
- Classroom Management – Should be create classrooms, edit classrooms and manage classrooms, other task is should be able to add users as student to classroom as well as should be able to assign teacher/teachers to classroom. Classroom is like actual classroom one subject may have one classroom, administrator can add users to a specific classroom or many classrooms then user can subscribe to lessons via chat.
- Teacher-Student Communication– Should be able to transfer chat between teacher to all users as well as teacher to specific student. Basically, all the learning happens through online chat, so one teacher has to teach to many students so this is a basic feature of the system,
- Student-Student Communication – Should be able to transfer chat between student-students, this is important when one student wants to discuss something with his friend.

5. Development Methodology

First of all, install ejabberd server, this can be installed on a Windows, Linux and Mac OSX as you wish. After installing server should be configured to use to developed client application. Editing manifest file, which is placed inside installed directory of the ejabberd server, can do this. The manifest file is in inside conf directory inside installation of the ejabberd server the file name is ejabberd.conf. After configuring the server, server can be accessed via given url and using username and password provided in the installation wizard.

The client application developed using HTML, javascript and some other web technologies, after configuring the server client application should be placed inside server when user access chat server via browser automatically then automatically loads developed chat system inside browser.

The mobile application developed using j2me that is a java version specially design for mobile devices and mobile application is highly optimized for mobile platforms this application can be run most mobile devices which support midp. The system provides the following features:

- a. *Registration*
- b. *Course Definition and Scheduling*
- c. *Payments and Billing*
- d. *Virtual Classroom*
- e. *Learning Content Creation*
- f. *Online Learning*
- g. *Management Tools*

6. Results and Discussion

Developed application can use to text chatting, but it is impossible to use Audio and Video chat, but complete e learning system needs proper audio and video chat with group video and audio chatting. But as basic e-learning system developed system can be use within small-scale organization with low cost and with minimum requirements.

Mobile application is very useful for many users they can study while traveling or in the home and clarify their problems with friends or with teacher.

Finally, this project needs some future development such as adding video and audio chatting support and file sharing which make the application fully complete e-learning system.

The modules which together form the complete Virtual Academy solution, highlighting the integration points between systems existing at a given tenant, be it a corporate entity or academic institution and also with the hosting service provider.

The possible integration and points with external systems are:

- iRegistration – Will require information regarding marketing campaigns, which resulted in the registration of a given student. In return the registration process will capture information about how a given student learned about the programs and why he or she chose to follow the same, and this information needs to be returned to the marketing system, which will typically be a CRM from a known vendor or a custom developed solution.

In addition, if the institute has a legacy Student Information System which for some reason they would wish to retain, synchronization of student profiles with this system will be required.

- iCalatog – For the course price and purchasing options to be in line with the financial strategy of an institute it will require integration with the institute's financial systems, as the ultimate price of a course will need to take into account the complete cost incurred in delivering the same.

Virtual Academy Functions

The functional modules that will be developed specifically for the Virtual Academy are described at a high level below. will describe the functional requirements for these modules in further detail.

iRegistration

The Student self-registration module allows students to enter personal and contact information and other details typically provided via non-electronic means. In addition, the module allows a student to maintain a single consolidated record of all academic achievements over a period of time, plan their future progress academically or professionally and provide a single point of reference for educators regarding student learning plans and history.

In additions all academic progress made at a given institution is also captured and displayed within this module, once the course or assessment is successfully completed. The registration profile is common across institutions and displays information relevant to all institutions regardless of which institution's portal the profile is currently being accessed from, giving the user a complete portfolio, which can be exported as an academic transcript or e-portfolio.

iCatalog

An on-line catalog of courses and scheduled events using which learners can purchase or subscribe to offerings. The module combines features of a product catalog, price list and course and event schedule, allowing users to browse through offerings available, make their selections and chose their payment method for chargeable offerings.

iReach Alerts

This module will allow any institution to select a set of events for which SMS based alerts should be sent out to their student/learner base, define the message to be sent for a given event and the dynamic values that should be retrieved from data available in the system to be incorporated into the message body. The message will be sent via an SMS gateway that will be globally configured.

iVClass

The iVClass'Virtual Classroom' will deliver live training sessions to a distributed group of participants over the internet. The use of video and audio interactions, together with sharing of the presenter's applications and desktop, a shared whiteboard and one-on-one or group chat sessions will allow trainers and

trainees to interact in real time. It will facilitate mentor assisted training, enabling learners to supplement face-to-face and eLearning courses with pre-scheduled live lectures.

iReach Classroom

The iReach client will be developed to provide anytime, anywhere access to e-Learning for users on the Virtual Academy. This module will allow users to learn online via e-Learning courses, or to 'stay in touch' with their lecturers and colleagues from within a 'Mobile Learning Environment' to supplement classroom learning, even if they're always on the road or don't have access to a PC or laptop.

The iReach™ Classroom will also acts as a place where users and can view what new supplementary learning content is available and what questions are being asked by any learners in the classroom, virtual or physical. The offline access features download and cache new learning content and store progress statistics, which are synchronized with the hosted system when the user is online.

iCatalog

The iCatalog module will be accessible as an independent web portal, which can be integrated with any product listing exposed as a web service. It will provide the following features.

Course Information Maintenance

This feature will allow the definition and maintenance of all information pertaining to a course. A listing of courses will be displayed, with the option to add new courses, edit existing courses and delete unscheduled courses. The add/edit page will capture or display the following information:

- 1) Course ID – Identifier for course; auto generated.
- 2) Course Code – Unique within institution.
- 3) Course Name – Plain Text.
- 4) Course Description – Plain Text
- 5) Course Details – Detailed course description, created as an XML document and displayed after processing by an XSLT, for formatted display.
- 6) Base Cost
 - a. Cost to be associated with modes, including live, online and eLearning. In system base currency.
- 7) Course Version – To allow the course to be updated from time to time.
 - a. Course Version Cost – if present will override base cost.
 - b. Active date and expiry date.
- 8) Course Prerequisites – ID's of pre-requisite courses
 - a. Prerequisite Entity ID – ID of prerequisite course or program

- b. Prerequisite Type – Type of entity (course or program)
- c. Prerequisite Criteria –
 - i. Mandatory – One prerequisite, and is mandatory
 - ii. Option – One of many defined pre-requisites, having followed at-least one is mandatory.
- 9) Course Audience – Level of student allowed to follow course (e.g. undergrad, postgrad). The selection will be validated against student profile, so when a signed in user views the catalog, the default behavior would be to list only courses that include the current student as the audience.
- 10) Course Content ID – Identifier of content item, for an eLearning course.
- 11) Base Credits – Default credits carried by the course, regardless of scheduling.
- 12) Total Duration – In hours

Lesson Information Maintenance

This feature will allow lecturers to maintain the details of the course. Listing of lessons for a course will be displayed. It will provide option to add new lessons, update existing lessons, and delete lessons. Lesson add, edit page will provide the following options.

- 1) Lesson ID – Identifier of the lesson; auto generated
- 2) Course ID – Reference to the course; foreign key
- 3) Lesson Name – plain text
- 4) Lesson Description – Plain text
- 5) Lesson duration – plain text to integer hours
- 6) Location typeID – location type suitable for the lesson.

Lecturer Information Maintenance

This feature will allow the definition and maintenance of all information pertaining to a lecturer. A listing of lecturers will be displayed, with the option to add new lecturers, edit existing lecturers and delete unallocated lecturers. The add/edit page will capture or display the following information:

- 1) Lecturer Name
- 2) Lecturer Profile
 - a. Textual Description
 - b. Profile Picture
 - c. Contact Details - including e-mail, phone number
 - d. Profile Page – Detailed page describing expertise, areas of interest and qualifications. Maintained as XML document, formatted using XSLT.
- 3) Lecturers available time slots will be enter here using a

suitable control or a UI.

Location Information

This page will allow the maintenance of Locations for the tenant, a location being any physical are which can be reserved for courses. A listing of locations will be displayed on entry to the feature, with the option to add a new location, edit existing locations and delete unallocated locations. The add/edit page will capture or display the following information

- 1) Location ID
- 2) Location Type – Location type whether lecture room, laboratory for practices.
- 3) Name
- 4) Description
- 5) Capacity
- 6) Location available time slot. Available time slots will be entered by a suitable time entering control.
- 7) Active

Program Information

A program will be a bundling of courses into a single program, which a student can register for. The program definition will display/collect the following information:

- 1) Program Code
- 2) Program Name
- 3) Program Courses – Selected from a list of all courses, both e-mode and lecturer delivered
 - a. Course ID – Filled upon selection
 - b. Mandatory – To be checked, if the course is mandatory

Schedule Information

This feature will allow courses to be scheduled and will contain information pertaining to the schedule. A course will be the template or object while the schedule will be the actual course instance. Schedules will only be maintained for instructor led courses – eLearning courses can be followed at any time, provided the defined pre-requisites are met. The following information will be captured when defining a schedule:

- 1) Schedule ID – Unique identifier for scheduled item, globally unique.
- 2) Course ID (subjectid) – Course identifier
- 3) Course Lecturer – Associated with lecturer information
- 4) Location - Room identification for physical class
- 5) Schedule Batch Title – Will default to course title, but may be updated to indicate instance specific information
- 6) Dates – Added using a calendar or a recurrence control, which will allow selection of the following:
 - a. Start Date
 - b. End Date

- c. Class Duration (validated to be less than or equal to course duration)
 - d. Recurrence
 - i. Daily – Will display from/to time entry fields
 - ii. Weekly – Will display Day-of-Week selection checkboxes, in addition to from/to time
- 7) Audience - Course registered Students will be the audience of the schedule. Students add to the schedule , removing the schedule will be done from the separate UI with datagridview.

Scheduling Helper

The scheduling helper will be invoked by a user wishing to automate the scheduling process. The helper will contain the following controls:

- 1) Courses – List from which the courses to be scheduled are selected
- 2) Lecturers – Once the list of courses is selected, the lecturer for each course will be specified
- 3) Locations – All class rooms or lecture halls to be considered by the scheduling algorithm will be selected from a list displayed
- 4) Period – A date range within which the courses should be scheduled.
- 5) Preview – This button will invoke the scheduling algorithm and create a draft schedule which can be published.
- 6) Publish – to publish the schedule to the tenant institute’s calendar.

The scheduling algorithm functionality will ensure that all courses are scheduled within the period allocated and that no two courses scheduled concurrently have the same lecturer or are allocated to the same location. It will also ensure that no mandatory courses of a given program are schedule concurrently.

Scheduled Programs List

This page will list the currently scheduled programs, and will allow a user to subscribe to a given program. Therefore, the details row of a given scheduled program will also display a button which can take one of the following forms:

- a) Add to Cart – Will be displayed for programs that the current user has not yet subscribed for but is eligible for the user’s subscription. Will allow the user to subscribe to the program, but directing him or her to the first step of the subscription process.
- b) Make Payment – Will be displayed for programs that the current user has subscribed to, but has only made a partial payment for. Will allow the user to complete any

pending ‘installment’ payments (using some payment gateway)

- c) Not Eligible – Will be displayed for programs where the current user’s profile does not reflect that he or she possesses the necessary pre-requisites specified for the program. Clicking on this button will take the user to the program details page which will contain defined pre-requisites for the program.

Course Schedule

This feature will allow showing the courses which are scheduled to particular learner, lecturer or the institute as a whole. This module basically acts as a time table for individual learners, lectures and institute administrators. The time table for a given user at a particular institute will display here.

This page will be represented as a calendar control and scheduled events will be marked in the relevant date and time columns for easy reference. This module should present a user interface that will feel intuitive to users familiar with the calendar control of MS-Outlook.

Individual User Schedule

Lecturer Schedule

Institute Schedule.

iVClass

Lecture Scheduling

Live lectures are scheduled by Lecturers or Tutors and will be visible to learners on the standard lecture schedule. When scheduling such a session, the schedule information entered at the VA user interface will be populated to the third party iVClass server infrastructure software. The information to be populated into the iVClass server will include the following attributes:

- Session Name
- Session Start Time
- Session End Time
- Lecturer/Tutor Name and ID – Presenter Name and ID
- Subscribed Learner Names and ID’s – Attendee Names and ID’s

The scheduling may be for a single session or for multiple sessions. A notification message with a link to the scheduled session will be sent out to the lecturer and all subscribed learners automatically once the session is successfully created in the iVClass Server.

Lecture Subscription

All users subscribed to the subject for whom the live lecture is scheduled will automatically be registered as attendees at the time of lecture scheduling. Additional subscriptions can be accommodated via a one-time subscription, for which a payment may or may not be required. Such subscriber names and ID’s will also be appended to the attendee list on the iVClass server.

Lecture Attendance

A user can join a scheduled lecture at the indicated start time, by simply clicking on the schedule entry in the class schedule page. A subscribed user is also sent a notification of the session with a link at the point of scheduling or subscribing to a class; this link can also be clicked on at the scheduled start time to attend the lecture.

Lecture Delivery Features

During the lecture, the lecturer will be able to initiate the following activities using the iVClass Client UI:

- a) Share Audio – Lecturer can initiate audio sharing using a button click.
- b) Share Video - Lecturer can initiate audio sharing using a button click.
- c) Upload presentation – Lecturer can upload a presentation to be accessible to all participants using a button.
- d) Share Desktop – Lecturer can share the active application on the desktop using a button.
- e) Share virtual whiteboard – Lecturer can share a virtual whiteboard using a button. Once shared the lecturer can enter text, mark or annotate and draw basic diagrams using a mouse or other pointing device.
- f) View Question & Answer List – A separate Q&A screen will be accessible using a button click. This list will display questions asked by the learners, which can be responded to by selecting a given question and typing in the answer.
- g) Chat - An on-line chat session can be initiated, with the chat window displaying the current messages, and providing the control to select whether a response is to a single learner or all attendees
- h) Survey – The lecturer can initiate and publish a survey, open polling and close polling, while being able to see a summary of all responses received on-line.
- i) Transfer control – Lecturer can transfer control to a learner, passing on all above lecturer features to the learner temporarily.

Lecture Recording

The entire lecture session will be recorded and can be published in the using some management DB system as a content item, or distributed to the iReach mobile client.

Additional Module Integration with iVClass

The following integration points will be enabled in the learning management system and social learning portal:

- a) Initiate iVClass Session with Content Publisher
- b) Initiate interactive session with lecturer.

iReach Alerts

The iReach Alerts module will consist of an integration API which invokes methods of a given SMSC, and the message

trigger and content definition wizard which will be accessed by an authorized user at the tenant site.

User Management

User Management will provide the following major features:

- a) Add new user
- b) Edit existing user information
- c) Delete users
- d) List users with search and sort

Group Management

Group Management will provide the following major features:

- Adding new group
- Editing existing group information
- Deleting group
- Listing group
- Adding users to group
- Exact search/search and filter group
- Sorting

Functionality Management

Functionality management will be the granting of feature access to roles. Authorized personnel will be able to select a role for a given unit and assign the system features granted to that unit. To perform any operation, a given role should be granted “Read” permission for that feature.

iReach Classroom

The iReach module will provide the mobile and offline access features with learning content security. The iReach client will be an application or ‘app’ which can be downloaded on to an android powered smart phone or a personal computer and used to obtain learning anytime, anywhere. It will be supported by a set of services hosted on the server, to which the client has to connect to occasionally to obtain new content and synchronize updates.

User Interface Features

The core feature set to be provided to an iReach user is:

SCORM Viewer – The viewer will allow a user to follow a SCORM compliant e-Learning course on a smart phone or offline on a PC, and track all events, which will be updated to the server immediately if the user is online, or stored for later synchronization if the user is offline.

Any SCORM compliant course should ideally be accessible via this viewer, but this would be subject to limitations imposed by the host device.

The user will see a list of assigned courses from which he can select a given course to start following the same. If he or she chooses to stop at some point, the application will record current progress and allow the user to resume following the course at a later date or time.

The user will be able to interact with the course controls using the touch screen, in the case of a smart phone, and a mouse and keyboard in the case of off-line access via PC.

Interactive Assessment Viewer – This viewer will allow a user to attempt an assessment on iReach, using the touch screen to navigate through the question paper and answer questions if a smart phone is being used, and using the mouse and keyboard when on a PC.

The user will be presented with a list of assessments assigned, from which he or she can choose to start a given assessment. Once started, the user will not be allowed to stop or pause an assessment without submitting the answers, and resume will not be possible.

The assessment results will be immediately updated to the server if the user is online and will be stored for subsequent synchronization if the user is offline.

Chat client – a user will be able to chat with his or her tutor or ‘batch’, which for a user on the academic portal will be the set of students following the same course. A user on the public portal will be allowed to chat with a designated ‘mentor’, if such an individual is nominated.

The chat client will indicate the online presence of a given user, and selecting this user will initiate a chat session. Group chat will also be possible for academic portal users, who will be able to see all online users in the batch in a ‘chat room’.

Offline users will not be allowed to use the chat feature.

Video viewer – The viewer will allow a user to watch video based courses within iReach; streamed video when online and cached videos when offline. The resolution supported and the size of the video that can be cached will be restricted by the capabilities of the mobile handset.

Document Viewer – The document viewer will be used to display tutorials, lecture notes and other text based content which will be provided as a part of an on-line course, or as supplementary material for a classroom based course. The viewer will ensure that delivered material can be viewed, but not copied or printed.

Settings and Sync – The user will be allowed to configure the learner profile on the iReach client using this interface. The user ID and password will be requested upon initial registration and will be stored within the client and used for authentication subsequently.

The ‘Sync Now’ button will activate the synchronization process, which will upload any progress statistics to the server and download any content queued for the user to the client.

Security Features and Resource Requirement

Security features will be transparent to the user, who will configure the initial iReach profile by entering the user ID and password which has been registered on the virtual academy. This profile information will be stored securely on the smart phone or PC, along with any other settings specific to the application.

The online authentication module will use profile information configured on the iReach client to authenticate with the virtual academy server, prior to initiating any data transfer for content

downloading or progress synchronization. The user will not be expected to authenticate himself when starting the application as it is assumed the owner of the smart phone will be the only person using it for learning.

On a PC the iReach client will again assume that the owner of the current operating system login is the user to whom the application profile is configured and will not request authentication.

7. Conclusion

This e-learning chat application is suitable for small scale organization and possible to use as basic e-learning tool. But, currently this tool does not have much features compared to commercial tools like Microsoft Lync. But this tool is free so this does not need to pay anyone and fulfill basic e-learning functions.

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