

Web Education System	
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Version:	Version 1.0
Location:	San Francisco Bay Area
Updated:	03/29/04
Printed: 6/7/2004 12:06 AM	

1 Table of Contents

Introduction	2
System requirements - server	3
System requirements - client	3
Project overview	3
Users roles	7
Database structure	7
Functional modules	9
Users registration	9
Users access	10
News module	10
Courses	11
Testing	13
Forum/Chat	13
Administration	13
Information protection	15

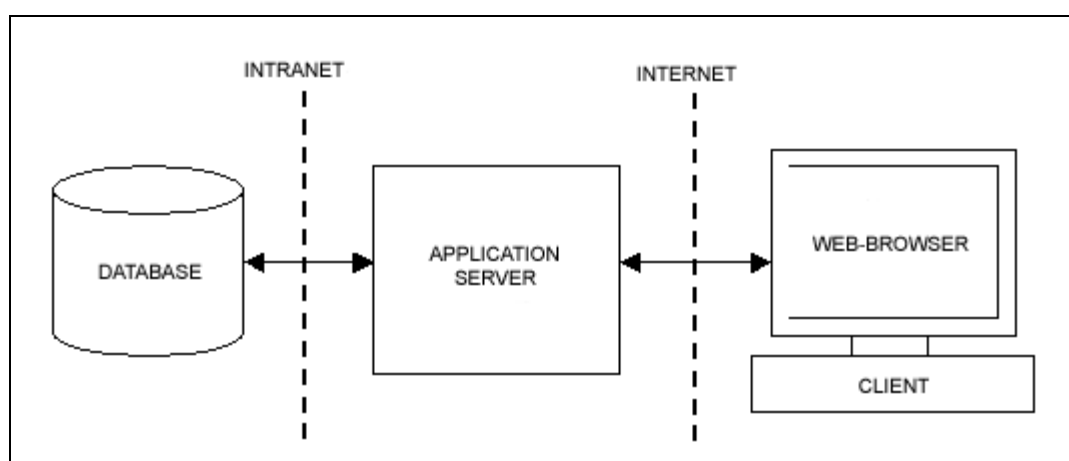
2 Introduction.

This specification described functional requirements for creation of web based Online Educational system. The purpose of the software requirements document is to systematically capture requirements for the project and the system to be developed. Both functional and non-functional requirements are captured in this document. It also serves as the input for design and development.

The structure of the system allows interacting without installing any software on client side. To access the system a browser is only required.



Client-server architecture



Using this approach is a de facto standard in online educational systems because it allows to access remotely by just using web browser: reliable and stable work via internet without such risks as dependencies from installing additional software on client side.

3 System requirements – server side

- Operational system: Unix/Linux
- Web Server: Apache
- Programming language: PHP
- Database: MySQL
- Disk Space on the server: 100 Mb

The server side of the system consists from the following components:

- User Interface (web interface), which is required to interact to the application from user side.
- Abstract user interface – serves as a middle layer between user interface and the system Will be written in xml language.
- Multithreading component – component of the system serving parallel requests from several users and transferring them to the server.
- Virtual engine – core of the system. Responsible for serving active resources
- Registration Manager - used to work with information component of the system
- User Manager - used to work with user records of the system.
- Session Manager - works with user session records
- System Component – consists from low level functions to interact with API of OS and database.

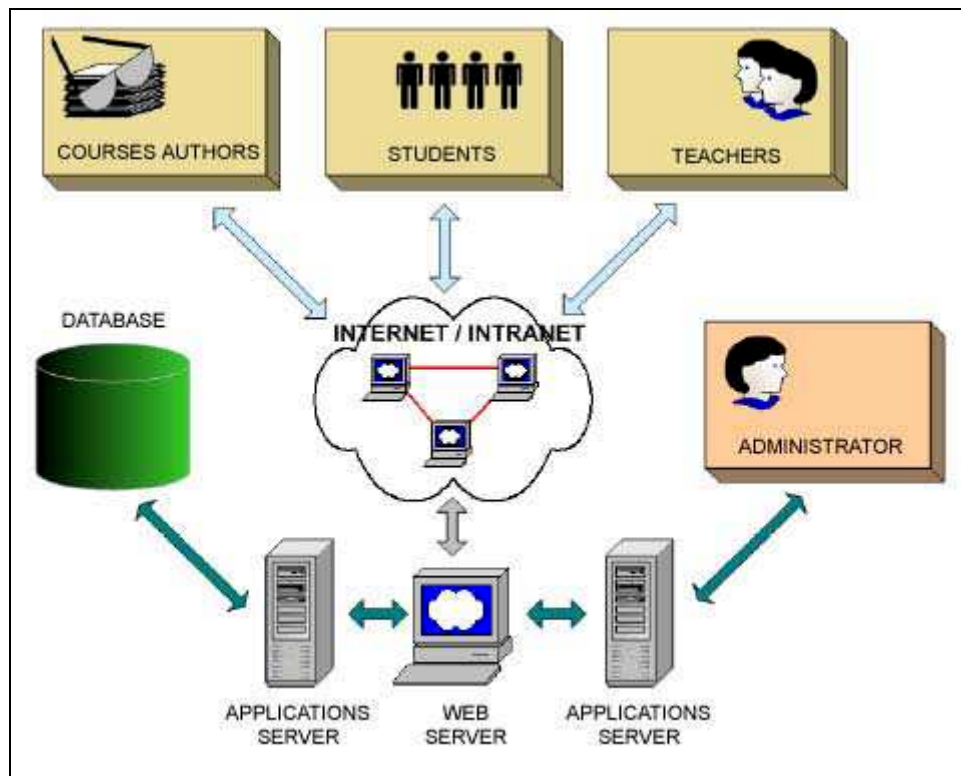
To implement server side interaction J2EE framework can be used that is giving us such advantages as platforms independence, network applications support, standard development library, support of different databases.

4 System requirements – client

- Operation System: Windows/OS/Unix/Linux
- Browser: any browser (IE 5.5+, Netscape.).

5 Project overview

Online web based system is based on the latest internet solutions. This is the most promising technology in distance education, allowing access to the system for students as well as teachers in any level: local or enterprise. In internet technology different methods can be used for study: online tutorials with pre-defined access and privileges in the system, online libraries online collaboration systems for students and instructors, testing, teaching and certification systems.



The online educational system allows the following:

- Test students knowledge on certain tutoring topics in any convenient time for both sides by using a library of predefined tests
- Keep and review test results in one central place on a server and to use them for the following educational grades.
- Easy extend, update or even introduce new study topic at any time during the educational course.

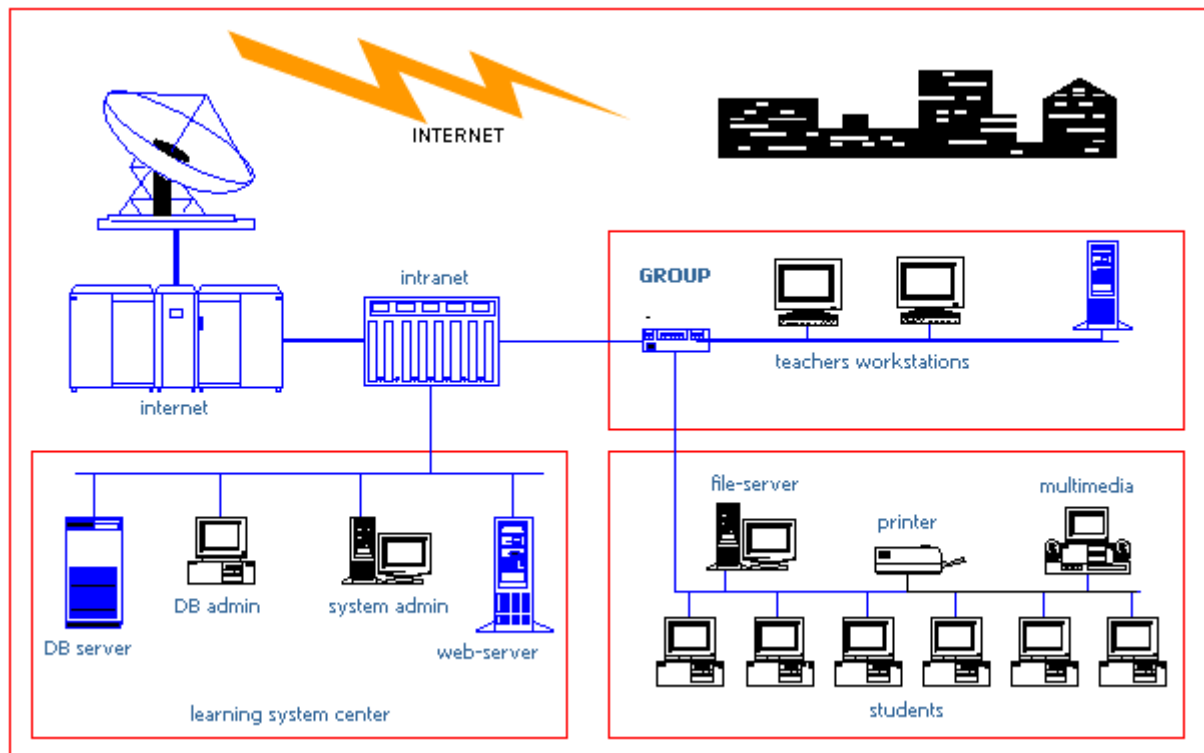
The system allows to use the following online education approaches:

- Access to the online courses via internet access
- Distribution of the educational content;
- Testing of the students performance
- Personalized online educational courses;
- Group work in the system;
- Keep in the system educational courses
- Creation educational courses according to study plans

The administrator can easily modify all the teaching materials and examination tests. This solution is for distance education services - small portals with online courses and following certification. The system is easy to use and allows users to learn all necessary materials online. The content can be different: it can be a university course or a private course for children, students and working professionals all around the world.

Schema 2 shows how the system is implemented. The local network allows creating educational network easily. Also the system allows to use this network to take online course or to administer the course from any PC.

Scheme 2



Education System - is a pre-designed solution for online studying. The solution requires minimal training, and implementation can be completed in days unlike the months required by the client-server e-Learning systems. The result is a significant saving in time, costs and resources.

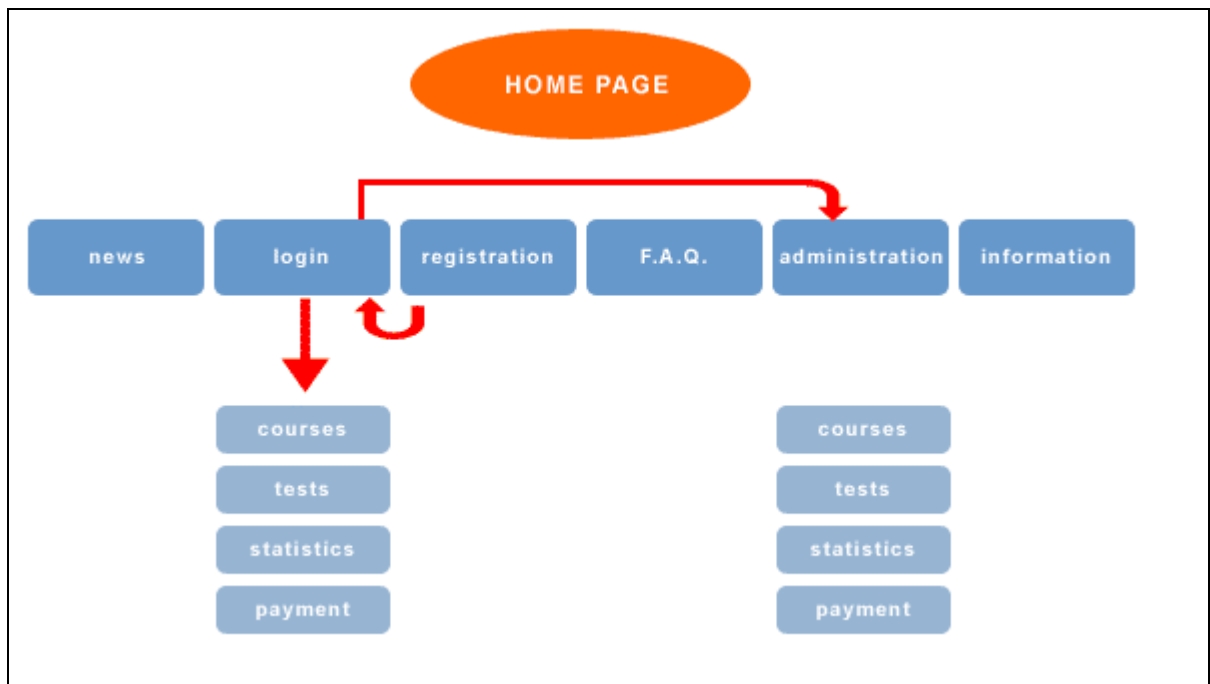
Advantages

- Easily customized and easily deployed solution
- The solution can be quickly adjusted to any design
- User-friendliness

How it works for users (students)

A user must register before he can view the course material, which consists of several pages of text with some graphics. There is no date or time restriction for completion a course. The student may stop his study and get back to any previous course whenever he needs it. Everything he needs is to enter his login and password. There is a time tracking system, which returns the student to the place where he has stopped his studying. After completing the course, the user is offered to take a quiz. If the user passes the examination tests, the system will automatically report the student's data to the administrator. After that the students can get the certificate.

E-learning Portal structure



6 Users roles

System requires 4 user types:

- Employee - none
- Manager - view/edit/create only within his/her group
- Human resources - view/edit/create/delete only within their company
- Site administrator - view/edit/create/delete all

	Employee	Manager	Human resources	Site administrator
View				Yes
View by access		Yes	Yes	Yes
Edit				Yes
Edit by access		Yes	Yes	Yes
Create all				Yes
Create by access		Yes	Yes	Yes
Delete all				Yes
Delete by access		Yes	Yes	Yes

Distance teacher features

- Edit course teaching materials
- Edit testing materials
- Edit time predetermined for reading
- Edit users
- Post news
- Post library articles

7 Database structure

Note:

All the requests have been considered except one: for different types and roles one table will be created instead of several. This table will have a record of the user type. A separate table will be created to describe user privileges

The database will consist from the following tables:

Users:

Field	type	Comment
ID		ID
last name		last name
first name		first name
company/facility partner		company/facility partner
title		title
address		address
city		city
state		state
zip		zip
manager		manager
center of excellence		center of excellence
training title		training title
source/sponsor		source/sponsor
training location		training location
training hours		training hours
type of training		type of training
comments		comments
User role		User role

Courses:

Field	type	Comment
ID		ID
Course title		Course title
Course description		Course description
Course content		Course content

News:

Field	type	Comment
ID		ID
News date		News date
News title		News title
News text		News text

Tests:

Field	type	Comment
ID		ID
Test name		Test name

Test questions:

Field	type	Comment
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Test ID		Test ID
Question		Question
Answer		Answer
Wright answer		Wright answer

8 Functional modules

8.1 Users registration

User registration module allows to register students.

In the registration form shows all required text fields needed to be filed. After filling the required fields and clicking “Submit” button a script checks the user input correctness and for required fields and record the data into the appropriate table (employee).

In the same way all other users can be registered (manager, administrator, human resources). Access to the registration module has only one user – admin. All other users have access only to the registration form for students

8.2 Users access

Access to the system happens after verification of the user credentials LOGIN и PASSWORD with the records that is kept in the database. If the access credentials match user is redirected to the Registered User Home page. If the user login/password doesn't match, the system displays an error message and is asking to enter the login/password again. Also there is “Forgotten password” feature implemented that allows to send password to email address.

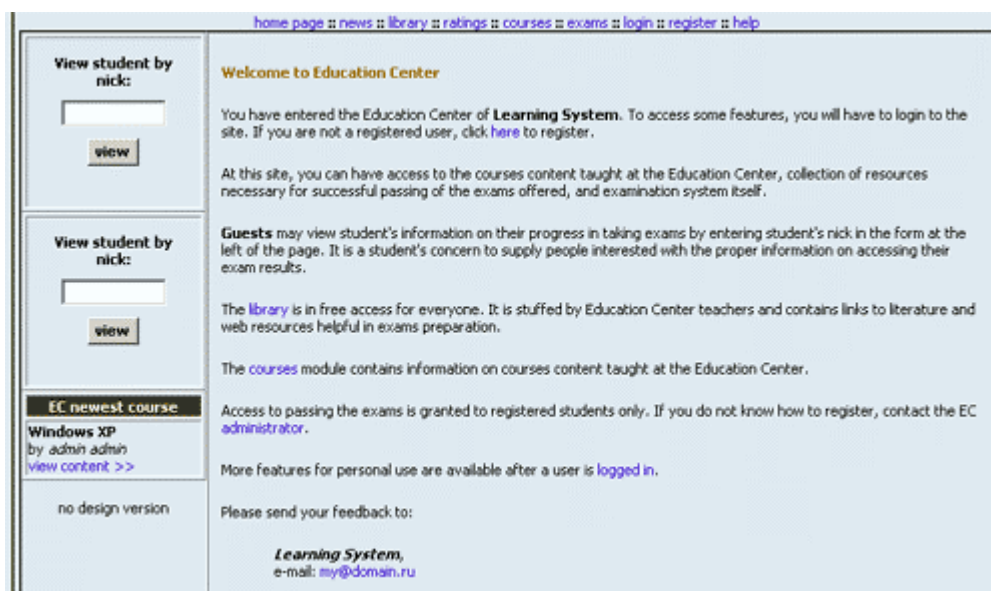


A login form with a light blue background and a red border. It contains the text "to proceed please enter" in bold. Below this, there are two input fields: the first is labeled "login:" and the second is labeled "and password:". Below the input fields is a button labeled "ok".

8.3 News module

News module is available on public and for registered users. It displays all E-learning system messages on the public page and on internal pages where the registered users see the tutorials.

Home Page screen



A screenshot of the Home Page screen. The page has a light blue background and a black border. At the top, there is a navigation bar with links: [home page](#) :: [news](#) :: [library](#) :: [ratings](#) :: [courses](#) :: [exams](#) :: [login](#) :: [register](#) :: [help](#). The main content area is divided into two columns. The left column contains three sections: "View student by nick:" with a text input field and a "view" button; "View student by nick:" with another text input field and a "view" button; and "EC newest course" with the text "Windows XP by admin admin" and a link "view content >>". Below this is the text "no design version". The right column contains a "Welcome to Education Center" message, followed by a paragraph about the Education Center, a paragraph about the "library", a paragraph about the "courses" module, a paragraph about exam access, and a paragraph about feedback. At the bottom right, there is contact information for "Learning System" with an email address "my@domain.ru".

Only admin has an access to edit news.

News publishing screen

Unpublished News Manager				
date	rubric	author	heading	action
2004-02-20 17:16:25	Text 1	admin admin	Testing	edit publish delete
2004-02-20 17:21:54	Projects	admin admin	New course!	edit publish delete

Headline:

Rubric:

8.4 Courses

Library module:

All system resources have the following parts:

- E-book
- text
- course
- study plan

Those information resources consist from other parts (example: text consists from sections that have in its turn their own questions). By saying that it needs to be confirmed that these resources work as containers for other resources.

Course screen

[home page](#) :: [news](#) :: [library](#) :: [ratings](#) :: [courses](#) :: [exams](#) :: [login](#) :: [register](#) :: [help](#)

View student by nick:

EC newest course

MS Office
by admin admin
[view content >>](#)

View student by nick:

course content: ms office

No information found.

course project description

A set of PHP-scripts to administer a corporate education and examination system via Internet/intranet.
A set of PHP-scripts to administer a corporate education and examination system via Internet/intranet.
A set of PHP-scripts to administer a corporate education and examination system via Internet/intranet.
A set of PHP-scripts to administer a corporate education and examination system via Internet/intranet.
A set of PHP-scripts to administer a corporate education and examination system via Internet/intranet.

Courses Edit screen

[home page](#) :: [news](#) :: [library](#) :: [ratings](#) :: [courses](#) :: [exams](#) :: [my pages](#) :: [logout](#) :: [help](#)

View student by
nick:

[view](#)

View student by
nick:

[view](#)

EC newest course
MS Office
by admin admin
[view content >>](#)

no design version

user pages of admin admin

:: [courses](#) :: [edit](#) :: [exams](#) :: [edit](#) :: [take / test](#) :: [results](#) :: [news and articles](#) :: [add / edit](#) :: [publish](#) :: [library](#) :: [add](#) :: [edit](#) :: [user information](#) :: [view / mail](#) :: [add / edit](#) :: [my personal data](#)

edit courses

[content](#)
[delete](#)

course	teacher
MS Office	admin admin
Windows XP	admin admin

re-assign course
MS Office to teacher admin admin [ok](#)

rename course
MS Office into [rename](#)

create new course
 [ok](#)

[home page](#) :: [news](#) :: [library](#) :: [ratings](#) :: [courses](#) :: [exams](#) :: [my pages](#) :: [logout](#) :: [help](#)

View student by
nick:

[view](#)

EC newest course
Windows XP
by admin admin
[view content >>](#)

View student by
nick:

[view](#)

no design version

user pages of admin admin

:: [courses](#) :: [edit](#) :: [exams](#) :: [edit](#) :: [take / test](#) :: [results](#) :: [news and articles](#) :: [add / edit](#) :: [publish](#) :: [library](#) :: [add](#) :: [edit](#) :: [user information](#) :: [view / mail](#) :: [add / edit](#) :: [my personal data](#)

edit courses

[content](#)
[delete](#)

course	teacher
MS Office	admin admin
Windows XP	admin admin

re-assign course
MS Office to teacher admin admin [ok](#)

rename course
MS Office into [rename](#)

create new course
 [ok](#)

ms office: course content

Chapter:
Duration:
[save](#)

Topics:

Comments:

course project description

A set of PHP-scripts to administer a corporate education and examination system via Internet/intranet.
A set of PHP-scripts to administer a corporate education and examination system via Internet/intranet.

8.5 Testing

Testing module is a part of the system that allows entering, editing and deleting courses.

Typical course looks like a set of questions with answers (correct/incorrect). If the answer matches with correct one in the database, student gets a score. After completion a test those scores are summarized and the total is displayed.

Features of the testing system:

- Questions in a text test can be displayed in unordered sequence;
- Answers in each text test question can be displayed in unordered sequence
- If it's needed several questions from a test can be displayed during a test

After passing a course the test results will be saved in the database. Admin of the system, instructor can see those results at any time later.

The following users have privileges to edit tests: admin, manager and human resources.

8.6 Forum/Chat

This module works as an online chat to connect students and teachers. It allows publishing text messages and images (GIF, JPG, PHG, BMP) for public view in real time.

The live display of the messages published by their teacher is implemented via frequent refresh of the browser (every 15 seconds).

9 Administration

The administration module consists from the following resources:

- Learning courses
- Users
- Test
- News

Administrator has the following privileges on these resources:

- Create a resource
- Add a resource
- Edit a resource
- Delete a resource
- Review a resource
- Execute a resource
- Upload a resource

All those actions can be executed via user interface which system uses to interact with these information resources.

The user management module will allow administrators and teachers to perform all user management functions like creation of students, other teachers, access filters and help manage them. User Management functions is explained in details below.

The new system will have three types of users. They are

Administrator

An Administrator is a super user who can create any other type of users. In addition to this an administrator will have the ability to create Teachers, HR Managers and students. Each function of the administrator has been explained in detail in the table below.

Teacher

A teacher is an employee of a company. Some teachers will be given the option of managing multiple student groups but most of them will manage only one student group. He/She will be a pseudo administrator with ability to create, edit or disable the users belonging to his learning course.

Student

Student is a user with least privileges among the users. Student users belong to their learning course and will access to the assigned content.

Functional Requirements

This section explains in detail the security and user management requirements of the learning system.

S.No	Short Description	Description in detail
1.	User management module	The user management module will allow administrators and teachers to perform all user management functions like creation of students, teachers, learning courses, access filters and help manage them. User Management functions is explained in detail below.
2.	Create User	The system will allow creation of four types of users as mentioned above. Only administrators and teachers will be allowed to create users. As Administrators are super users, he/she will be allowed to create users of any type. Teachers will only be allowed to create students for his/her own learning course that he/she is managing. When a user is created, he/she will be activated by default. If need be, the administrator or teacher will be given the option to deactivate the user. Deactivation will disallow the user to logon to the learning portal. External users will not be allowed to log on to the learning portal.
3.	Modify User	This option will allow administrators, teachers to modify user profiles. As mentioned above, administrators can modify the profile of any user but teachers will be allowed to modify the profiles of only those users (students) that belong to his learning course. For instance, teacherA will not be allowed to modify the profile of a TeacherB user and vice versa. Also teachers and administrators will be able to view the user details.
4.	Delete User	It will be possible to delete only teacher/student user from the system. Once a user is deleted from the system, he/she will not be able to login to the learning portal. If a deleted user needs to be given access to the portal, he/she will need to be recreated. Only teachers and administrators will be allowed to delete/disable users. An administrator will be allowed to delete/disable any user while the teacher user will be allowed to delete those users

S.No	Short Description	Description in detail
		(students) that belong to his course.
5.	Search Users	<p>The system should allow administrator/teacher user to search for other users. The search string from the Graphical User Interface (GUI) will be collected and matched against the user name. The system should allow the users to search users within existing accounts. If the user name is not known, the system should allow a generic search and list all the users. There will be a search filter that will let users set their search criteria. A user will be allowed to search for the following types of users.</p> <ul style="list-style-type: none"> 4.2 Active Users 4.2 Disabled Users 4.2 All Users
6.	Create learning course	Learning courses are nothing but a collection of users who have the same level of security. Only Administrators can create learning course. An administrator will be allowed to create learning course but a teacher user will be allowed to create students only for his/her own learning course that he /she manages.
7.	Delete learning course	The system will allow deletion of learning courses. When a learning course is deleted, all the students and teachers will be deleted from the learning course they belong to.
8.	Modify learning course	It will be possible to modify the learning course description. Only teachers and administrators will be given this functionality. As mentioned above, only Administrators will be allowed to create learning courses.
9.	Authentication	After a user submits his credentials at the login page the credentials will be collected and validated against security repository, which is store on database. If user is found to be matching, the user will be allowed access to the learning portal. The authentication module will not allow disabled/deleted users and expired users to log on to the portal.
10.	Authorization	Administrators/Teachers will be allowed to see the link for uploading static documents and generation of learning courses. Public users will not have access to any of these special links.
11.	Password Policies	When a user is created, he/she will be assigned with a default password. A password policy is one in which the system does not allow the user to create a password that is less than 6 characters long and the password should be a mix of alpha numeric characters. Only characters and numbers will be accepted.
12.	Session Expiration	Only one instance of user will be allowed to login with the same userid. If a user with login id XYZ is currently logged on and another user tries to log on with the same userid i.e. XYZ, the session for the first user should expire and the user will be requested to

S.No	Short Description	Description in detail
		re-login.
13.	Idle Timeout	Each time a user logs in, he/she will be associated with a user session. This session will have an idle time out period of 60 minutes. This means that if the user's browser is idle for 60 minutes or more, the session for the user will be expired and the user will be requested to re-authenticate himself/herself. The session time out value will be a configurable parameter.
14.	Forgotten Password	All Users will be provided the "Forgotten Password" facility, which allows users to reset their own password once they are able to provide answers to the secret question that is challenged to them. The users' email ID will be used as user name. Once the users provide correct secret answer, a system-generated password will be mailed to their mail id.

External users will not be allowed to log on to the tutorial portal.

Users Administration screen

name	address	e-mail, phone	notes	action
admin admin (A) login: admin passw.: admin	NoAddrYet	email@somedomain.com NoPhoneYet	none	edit delete view sent messages
11 11 (S) login: 11 passw.: 11	11	11@11.com		edit delete view sent messages

Examine Administration screen

The screenshot displays two side-by-side panels of a web application for creating and managing educational content.

Left Panel (Test Editor):

- test1** (highlighted with a red box):
 - last-modified: 2004-02-20 17:15:48
 - total number of questions: 1
 - category of complexity 1 - 1 question(s)
- question no. 2**
- select level of complexity:** 1 (dropdown menu)
- question:** A set of PHP-scripts to administer a corporate education and examination system via Internet/intranet. (text area)
- include picture:** 06sop... (text area)
- right answer:** (text area)
- wrong answer:** (text area)
- wrong answer:** (text area)
- wrong answer:** (text area)
- wrong answer:** (text area)
- wrong answer:** (text area)
- reset** and **save** buttons at the bottom.

Right Panel (Question Preview):

- Question 1**
- level of complexity: 1**
- picture** (icon)
- right answer:** A set of PHP-scripts to administer a corporate education and examination system via Internet/intranet.
- wrong answer:** A set of PHP-scripts to administer a corporate education and examination system via Internet/intranet.
- wrong answer:** A set of PHP-scripts to administer a corporate education and examination system via Internet/intranet.
- wrong answer:** A set of PHP-scripts to administer a corporate education and examination system via Internet/intranet.
- wrong answer:** A set of PHP-scripts to administer a corporate education and examination system via Internet/intranet.
- wrong answer:** A set of PHP-scripts to administer a corporate education and examination system via Internet/intranet.
- delete picture | edit | delete** (links)
- new question | finish work** (links, highlighted with a red box)

Distance learner features

- Course teaching material is presented as a text with some graphics
- FAQ
- The course material is available at any time and from any user account.
- The time tracking system will save all user logs and would allow to stop a test and return back to the stop point at any time
- Simple quiz to check the student performance
- Grading

10 Data protection

This section of the document specifies security requirements for the tutorial and user security implementation.

Security can no longer be treated as a plug-in anymore. It is the integral part of any enterprise system. Two layers carry out the security system of the project. The first layer is responsible for user authentication and access to the system. It uses Role-based security in Forms Authentication. This layer determines what user has logged in, user privileges within the system and gives this user certain access to resources. The second layer is responsible for access permissions in system. It supervises user permissions for interaction with data. This layer uses developed components and database..

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A user will submit his/her credentials at the login page. The credentials will be collected and validated against security repository, which is store on database. If user is found to be matching, the user will be allowed access to the tutorial. The authentication module will not allow disabled/deleted users and expired users to log on to the portal

To protect browser connection with server a cookies session will be used. Recording a session in a browser allows recognizing a user at any given time in later visits.

The system allows performing administration of the users and resources. The system also allows to have personal as well as group access to the learning courses, record the user logs, work results and remote administration of the system.