

System analysis, design, and implementation: A learning portal management system for training the employees

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This paper presents a development process of an e-learning system software. The main objective of the software developed is to provide a portal to those who aim to get their learning solutions online. As it is composed of a flexible system, it can be used by companies -from middle sized to large sized- for training purposes, by instructors and students of colleges and universities for lecturing or by various organizations who wishes to train their staff online. The primary target area of the software developed is for corporate markets with a human resources policy that supports the training of the company's employees. In fact, other organizations like educational, health or municipal ones can implement it easily.

Keywords corporate learning systems; e-learning; information systems

1. Introduction to problems

The e-learning market has gained a gradual increase in recent years; people began to revise their ways of learning. The rise of availability of higher bandwidth Internet connections is also a plus in this trend. Different companies bring up various solutions. These solutions have both pros and cons in their manners [1]. The factors getting more important are:

- The interaction between instructors and students
- The interaction between students
- The follow up of students' attendance and success rates
- The availability of content
- The currency of content due to the demand
- Simulating a virtual class environment online

In such an environment, this project prefers to focus on these factors affecting the efficiency and user satisfaction in e-learning.

2. Methodology

Being a web-based portal, first the web development platform is determined. Using an open source platform will be more flexible and have lower cost due to free licensing. The subjects considered during the development phase are as follows:

- Programming language: The web programming language used in the project is PHP 4.3.11. PHP is a widely used general-purpose scripting language that is especially suited for web development and can be embedded into HTML. It is a C based language and therefore it has the power and flexibility of C as well as it providing Object Oriented Programming methods [2].
- Development tools: Macromedia solutions are preferred in both web programming and content development purposes. For the design of the static and coding of the dynamic pages, Macromedia Dream weaver MX 2004 which is quite powerful in many aspects is used. For the content development, Macromedia Flash MX 2004 is used, because it is again a very powerful and wide spread program preferred for animations and web design purposes. Other than these, Microsoft Office 2003 is used for the documentation, presentation, and communication jobs. GlobalScape CuteFTP Professional that is

benefited for the upload of web files on the server. Lastly, Adobe Photoshop CS, which is indispensable for image edition and web publishing, is preferred.

- Database selection: The database solution, MySQL 4.0.22 is selected, as it is an open source though quite efficient and effective solution for data storage and handling. This is a free-license database solution for web development and it has a serious impact on the cost of the portal. For the interface of the database phpMyAdmin 2.6.1-rc1, which is a very easy to use program, composed of PHP pages, is used [3]. Again, it is an open source solution and flexible for further developments.
- Web hosting: FreeBSD 5.3 is installed on the server as the operating system and setup the FTP server, database server (MySQL 4.0.22), mail server (Squirrel Mail) and web server (Apache 1.3.33) on the same machine. It would be an efficient solution although all the servers are located on one machine because a UNIX server is used and there is limited number of domains on this server. Therefore, performance is not expected to be a problem for this system's solutions.

3. Analysis of the portal “fullEarn.com” requirements

The first point to mention is the users of the system. Different user types can use the portal. When these users are registered with the site, they are supposed to have a certain role that will determine their usage. They can be a “student”, an “instructor”, or a “corporate user”. The process begins with the application of the corporate user for her/his organization that wants to use the system. After the registration of the corporate user, an account is opened for that organization and courses are added to this account. After that time, students are added to the system by the corporate user for the organization and with these accounts, students enter the site and get the content related with the lectures assigned to the corporate account of the organization. There are both animated and static lecture contents and examinations for the lectures taken by the students. They can also have a look at their class and interact with other students in the class and instructor of the class related with the class course. The instructors assign homework to these classes and students can submit their finished homework. The instructors of the system that the company thinks of choosing in the future compose these examinations and homework.

The required processes followed in this system can be listed below:

- The administrator opens a new “corporate user” account
- The administrator opens a new “instructor user” account if new instructors are required
- The administrator opens a new course or courses for the corporate account if required and assigns an instructor to the course
 - The “corporate user” opens “student user” accounts and registers them for the courses by assigning the suggested courses to the students
 - The “corporate user” opens classes and registers students to these classes and assigns a course with its instructor
 - The students get the course content and their attendance is followed by the instructor of that course
 - For the examination processes, the instructor inserts new questions into the database and creates tests from these questions on the courses he/she gives out. Afterwards, tests' reports are generated for the instructors and “corporate users” to follow and mentor
 - For homework assignments, and evaluation and grading processes, the instructor can assign homework to students that he/she instructs in his/her classes. Then, the homework results are announced.

4. Design and implementation phase

The design and implementation of the database is carried out on MySQL DB server engine. The tables and established required relationships are defined. The database structure is divided into two parts in this paper, because of the insufficient space on the pages, but the table “users” is the main identity in both Fig. 1 and Fig. 2. Therefore, the relations can be perceived accordingly. The tables are on the following pages.

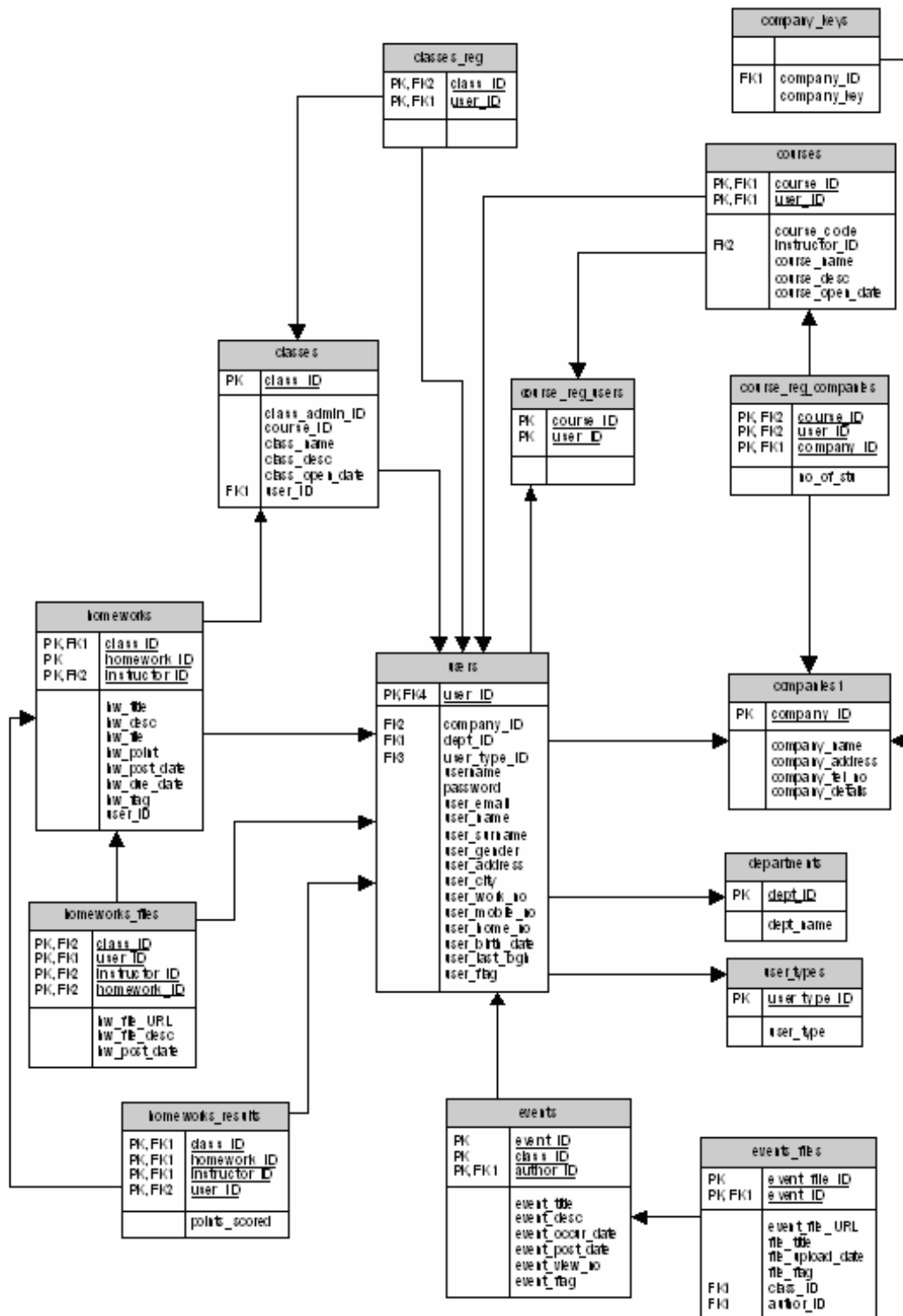


Fig. 1 Database structure A.

The tables placed in this paper are the basic tables of the system's database. Other than these, it also consists tables of twatch© which is an open source program written for the following user visits and pages statistics [4]. It is also thinking of integrating a chat program into the portal and this will bring more tables to use in the near future. These additive tables do not have much to do with the processing of the portal but rather they are like standalone scripts among the site.

The portal consists of many different interactive pages. As an example, "the corporate user main page" is shown in the following Fig. 3.



Fig. 3 Corporate user main page.

5. Conclusion

The system, fullEarn.com, offers all the main features of a web-based training system. It gives utmost importance to user interaction among the site and that creates a "community concept" which makes users feel more in a virtual class than in an e-book page.

The system is still in an evolution, different aspects are added on it day by day. First, we are supposed to add a chat option. This chat application will provide further opportunities for interactivity and communication in the portal. Therefore, we will be able to increase the effectiveness of the processes, because we prefer open source platform for administration and development, we will be able to offer solutions with lower costs and that will be an advantage for fullEarn.com. Furthermore, this system will offer both standard course packages and client specific courses managed by the instructors or the instructors hired by the clients. This will provide flexibility and scalability to the system.

In addition to these, we are supposed to provide a richer and more satisfying content for the users. For this purpose, we are planning to develop both the dynamic, animated courses and the static, text-based courses.

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