EvalEdit – Online Editor for E-learning Tests

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As our society has gradually changed in the past few years with the new technology, the internet has become more and more present at our workplace and in our learning methods. The internet brought us an easier access to information offering a range of tools and capabilities to workers.

Teaching and learning has changed since the technological explosion. The related aspects to their effectiveness are: time, place, delivery process and learning process.

In this article we'll try to explain the associated concepts with e-learning, like the stakeholders involved, the technology and the provided products and services, and other related issues and trends.

***Keywords:** Internet, E-learning, Information Communications Technology, PHP, MySQL, Databases.*

1 Introduction

Introducing computers, the traditional trainings have become digitized and so the history of technology-based trainings is well over 30 years. Therefore a computer-based training can contain video and multimedia materials, being distributed even on CD-ROMS, the only problem being the difficulty of updating the CDs.

Therefore, we can replace the CBT with WBT (web-based training), the trainings on the internet being more available to every learner at any hour. Also, the information can be updated easily; therefore e-learning has become very popular terms all over the world.

The internet supports the delivery and the communication in e-learning, such as: the learners or the universities deliver the learning content (e-books or courses) to their students through internet and they communicate through e-mail, discussion forums, and instant messages and so on [15].

E-learning seems to become a solid theme of research and activities such as lifelong learning, self-directed learning and others, promoting the virtual learning and the virtual universities. We can therefore notice an explosion of e-learning but not only in the academic field but in the commercial organizations too. In this way it appears also the market for the educational products which is expanding rapidly all over the globe [2].

Security in e-learning means protection of electronic communication and e-learning platforms but hiding the technical details from the educator and learner. However, creating a total secure e-learning system is almost impossible but we will try to define secure and to identify the possible issues [7].

2. E-learning Concepts and Evolution

E-learning is the interaction between the educative process and ICT (Information Communications Technology). The prerogatives of the conventional learning are: modeling the personality, the competition spirit and psychological support between students. The Internet is a study object but also a bibliographic or image source for preparing or presenting the projects. By 2000, 98% of the Canadian and US schools were connected to the Internet. There were made substantial investments in IT training programs for the teachers and in promoting products or services like: electronic guides or publications, materials, FAQ and thematic discussion lists.

The Internet will improve the education, will change the current learning methods, and will accelerate the innovations and the research work. By 2020, the illiteracy and the inappropriate education will be substantially diminished through the virtual class opportunities. Any student can have access to any library, information or teacher from all over the world. The Internet facilitates the know-

ledge and opinion exchange as well as the real time data evaluation [6].

The learning is an institutionalized and organized process. The training is a free and individual action.

There are some on-line learning models:

• The Computer-Based-Learning (CBL) appeared in the 70's-80's period. It uses educational software stored on CD or hard-disk and it includes dictionaries, encyclopedias, math lessons, foreign languages lessons, geography and so on (e.g.: Encarta, Le Louvre, Mihai Eminescu).

• The Web-Based-Learning (WBL) provides trainings through Web courses and it uses software tools specially designed for accessible web training. It also includes electronic manuals and links to other educational resources.

• The Web-Based-Teaching (WBT) has besides the features of the WBL, a communication system between teachers and students- e-mail list or discussion forums [6].

• The Web-Base Course (WBC) has a purpose the step by step training on a particular theme. A database of all the WBC can be found in the CISAER catalogue.

• The Web-Base-Course Environment (WBCE) provides access based on username and password to course materials, debate forums and also it allows the evaluation through tests packages and knowledge evaluation like: ARIADNE, Blackboard, and WebCT. The Virtual Class has a large number of students from different countries and areas who communicate in real time, the hours of the courses being fixed. It uses technologies like: the interactive television, the audio-video conferences or chat sessions.

• The Networked Learning provides an independent learning of time and space, being based on interactive communication between teachers and students and on-line courses.

• To sum up, the "Online Learning" is at the same time: the Web-Based Learning, the Internet Based Learning, the Technology-Based Learning, the Open Distance Learning and the Distributed Learning [9]. E-learning implies a virtual class, a web accessible material composed by dynamic and static components, a trainer, a virtual community, the activity monitoring, simulations and audio and video interactions.

E-learning allows prequalification or specialization and it's addressed to wider social or age categories being though, more expensive. In e-Learning the geographical isolation or the medical problems are not anymore a problem. To start e-Learning you have to have a clearly motivation and a series of skills. The teacher's activity is also more complex being changed the way of work. The learners have difficult access to auxiliary materials (libraries) and can have a limited dialogue [12].

E-learning radically changes the work methods, the information scan system and the memorizing procedures bringing school to the students. In e-Learning it is not recommended providing already prepared knowledge as the virtual learning environment has to help the user build its own mental understanding structures. E-learning provides possibilities of particularizing the content and to control the self teaching process. It facilitates the establishing of new relationships between the institutions, the teachers, the communities, the workplaces and family with the learner.

A particularity of e-Learning is the change from content-based-learning to context-based-learning [8].

E-learning refers to the environment and the stakeholders to support the persons involved in making the trainings. It includes: instructors, experts, educational specialists, course designers, administrators, IT professionals who handle the development and the management of the courses. The e-learning technologies are evolving rapidly and the request for trainings and e-learning is increasing in both sectors involved (educational and commercial), therefore the market for the digital content is expanding.

The e-learning has different content and different way of running based on the providers' perspectives or learning style and experiences.

The effectiveness of e-learning can be measured in three different ways: from the tech-

nological perspective-through reusability and interoperability, from the administrators' perspective-through cost, profit, enrollment and success rate and from the learners' perspective, depending on how to achieve the desired goals.

Reusing the e-learning materials is necessary for the economical benefit as the materials for the online courses are very expensive to realize [10]. We also find this term in software engineering where we have programs structured in objects. "Learning objects" means in object-oriented programming reusing the objects in other programs, instead of creating them once again. Therefore, the learning objects for the courses will be stored in digital repositories where they can be accessed, modified and reused by the course designer.

To access them easier or to combine them, the learning objects have to be standardized with two major standards: Interoperability standards and content-packing standards [3].

A repository for learning objects stores the learning materials so it has to provide an indexing system or a catalogue to improve the material search.

Educators in the E-learning Ecosystem are preoccupied more about the quality of the materials, including in their course, not only the content, but also the learning activities. Because the learners have to work together, to be able to assimilate better the knowledge, the communication tools in e-learning are a very important feature [5].

Some of the used learning activities might be: the discussion forums, the e-mail, the instant messages, and so on. However, packaging the materials with the learning activities can be too difficult for the educators, as the activities are each designed for a specific context [13].

E-learning can be efficient only if a learner has the necessary readiness. Because the e-learning happens on the internet it is very important that the learner has creativity and the willingness to seek for help and to eliminate the technical barriers.

3. EvalEdit OnLine Application
In recent years, internet based learning has developed as a new paradigm. However,

more recently, companies realized that one of the major factors in having successful internet based learning is the design of a user interface that is in concordance with the users' expectations, which includes both functionality and user-friendly features. The functionality feature of an e-learning interface is one of the most important elements when discussing about specific internet based learning. In our paper, we used methods to model task flows for e-learning interfaces. We strengthen our study with the design modeling of a practical scenario that may appear in an on-line learning environment.

Our application is realized according to the IEEE STD-1016-1998, *IEEE Recommended Practice for Software Design Descriptions.* In this standard *are* described the content and qualities of a good software requirements specification (SRS) and are presented several sample SRS outlines. This recommended practice is aimed at specifying requirements of software to be developed but also can be applied to assist in the selection of in-house and commercial software products [19].

These application will design an independent and dynamic site on the Internet addressed to users who want to auto evaluate themselves on-line. The dynamic site offers the possibility of quick changing of the exposed information, providing the users new information and the possibility to interact. In a dynamic site, the interactive elements can be added very easily. Also, having the presentation content separately, in a database can be easily created duplicates of the site, with the right format for the destination. EvalEdit is an internet application whose purpose is the on-line evaluation and the editing of the existing grill tests for the evaluation. This system's role is to improve the internet study and to offer the owner the possibility to update it, making a better evaluation of the users' knowledge. The purpose of this system is not only to create the possibility for the users to verify their knowledge online but to create the possibility of improving their knowledge gradually, allowing them to see their tests results. On the other side the application will offer the operators/administrator possibility to pe-

riodically change the tests to allow an effective update of the evaluation system.

3.1 Technological aspects

Along with the rapid evolution of applications from different domains, where the interaction between the user and the informatics system has a tremendous impact, the development of structured, advanced interfaces, also occurred. In this context, since the most of the users are not familiar with the way informatics applications work, a suggestive design is essential for graphical interfaces.

For the realization of this site which has to be used on the Internet - EvalEdit uses PHP and MySQL. We chose making a database in MySQL because the access and handling the database is easier comparing to other platforms of work, which allows an easily information update. Another important reason for using these programs is the fact that they are cross-platform- meaning that they can be compiled from Windows and Linux also. PHP and MySQL offer the possibility of making a dynamic site with a simple and accessible interface for any user.

For the realization of the site we used also the HTTP Apache server which is secure and extensible.

The site can be used as a free site, on the Internet. As well as the evaluation and the registration of new evaluation tests will be available, without restrictions, to anyone that accesses this site on the Internet. It will be an operator who can ensure the elimination of the invalid tests and to update the old ones.

3.2 Structural and functional concepts

In order to create an efficient interface that would be used to accomplish possible functions of the application, a clear and solid notation system for task flow modeling is needed. The notation system is required for a proper integration of the offered functionalities and interactive aspects [3]. The notations must be easy to understand and use, and must be able to structure large specifications employed in e-learning applications.

Furthermore, it is essential that the notations have a precise semantics that would eliminate the possible ambiguities in communication [6]. In this context, the task flow modeling is very important for advanced interfaces, with the purpose to facilitate the work of those that develop interactive application, where the dialog human-computer is essential. In the case of a commercial application, both the user and the implementer should have a clear view of the task that can be carried out using the interface.

The EvalEdit site is based on two sections: Evaluation Section and Edit Test Section. The Evaluation Section has three modules: Eval OnLine Module, Test Module, and Eval Module. The modules for the Edit Test Sections are the following: Edit Test Module, and Options Module with two composes: Add Module and Modify Module. In fig. 1 we present a functional schema for our application.
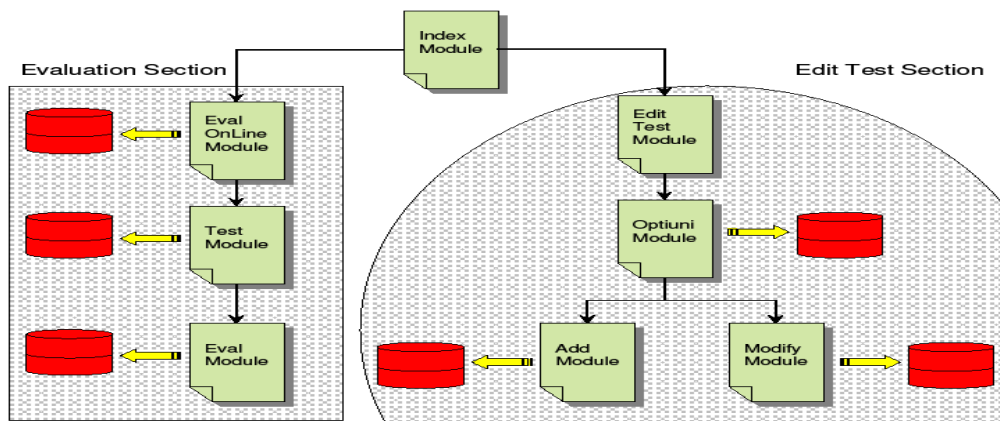

Fig.1. Structural and Functional Schema

The Eval OnLine Module allows the learner to choose the domain, allows introducing the user's name so that it can be found afterwards in the database, and if he will make another test to return his evolution diagram.

The Test Module allows displaying the questions from the chosen test. The module will access the database to identify the domain and the required test for evaluation and to introduce the student's name in the database.

Eval Module verifies if the student's name already exists in the database and offers him the possibility of changing the name if this already exists in the "students_name" table. It also allows choosing the wanted test from the selected domain. This module allows the evaluation of the student's answers, and calculates the number of correct and incorrect answers, the total number of points, it displays the student's answers next to the correct answers and the corresponding points to each questions, displaying also a comparative diagram for the student who has performed other tests from the database.

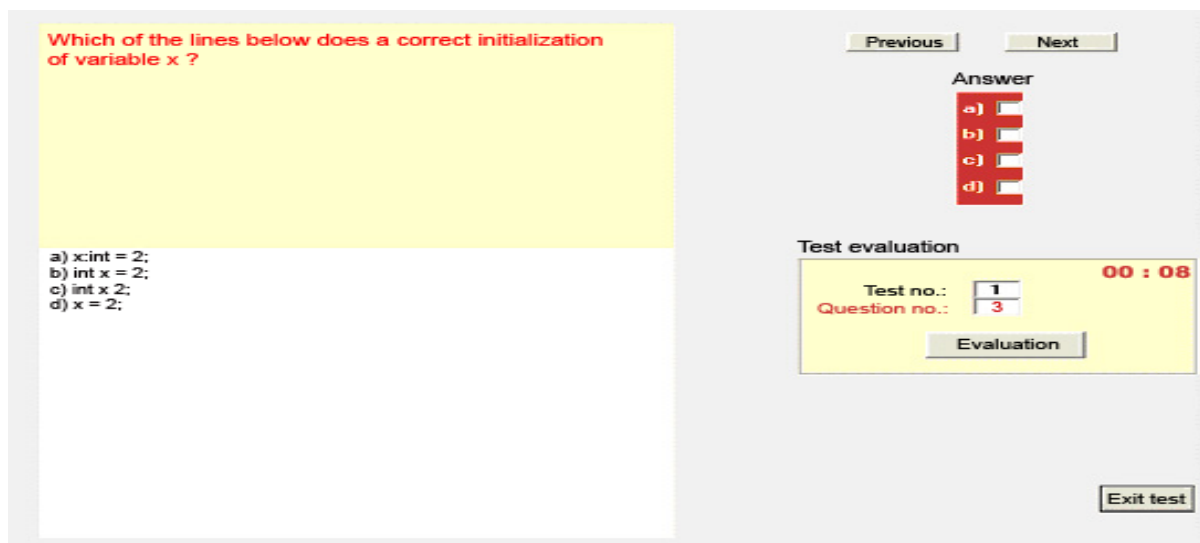The fig. 2 shows an example for testing which used the Eval Module:

Fig.2. Test Example

The Edit Test Module allows the access in the text editing area, based on the username and password. The module accesses the database to identify the username who introduced his personal data.

The Options Module allows the displaying of the available editing options: a) adding domains and tests; and b) modifying the tests.

The Add Module adds a domain and a test. The adding of a test it's made by choosing a domain name in which the test is situated by introducing a test name and setting the total points. The module interacts with the user and the database to take over some general information of the new test and the domain's name.

The Modify Module selects the chosen domain for the modification. The module interacts to the user to take the domain name and to the database to extract this information.

Database Administration

The database facilitates the access to the site's information. This is accessed by all the existing modules, allowing adding, deleting or modifying the information. The data access is realized through appropriate functions compatible to MySQL.

There are many aspects for "computer security in E-learning" but we will start with the classical CIA requirements: confidentiality, integrity and availability [1]. The dependability includes more security aspects: the availability, the reliability referring to a continuous correct service, the safety, defined as the absence of consequences on the user, the integrity and the maintainability which has the role to change and repair the service.

In the context of e-learning are definitely needed typical security measures for any serv-

er and application. These include software updates, data backups and redundant hardware [17], security risk analysis [17], privacy [18], database security [16], role-based access [11], availability [18].

In our application we'll tray to respect some security requirements [14]: availability, re-liability, safety, confidentiality, integrity, maintainability.

A database is an essential component in any e-learning site, since it stores all the history of transactions in the system. The Fig. 3 shows an application model of the interaction with a database.
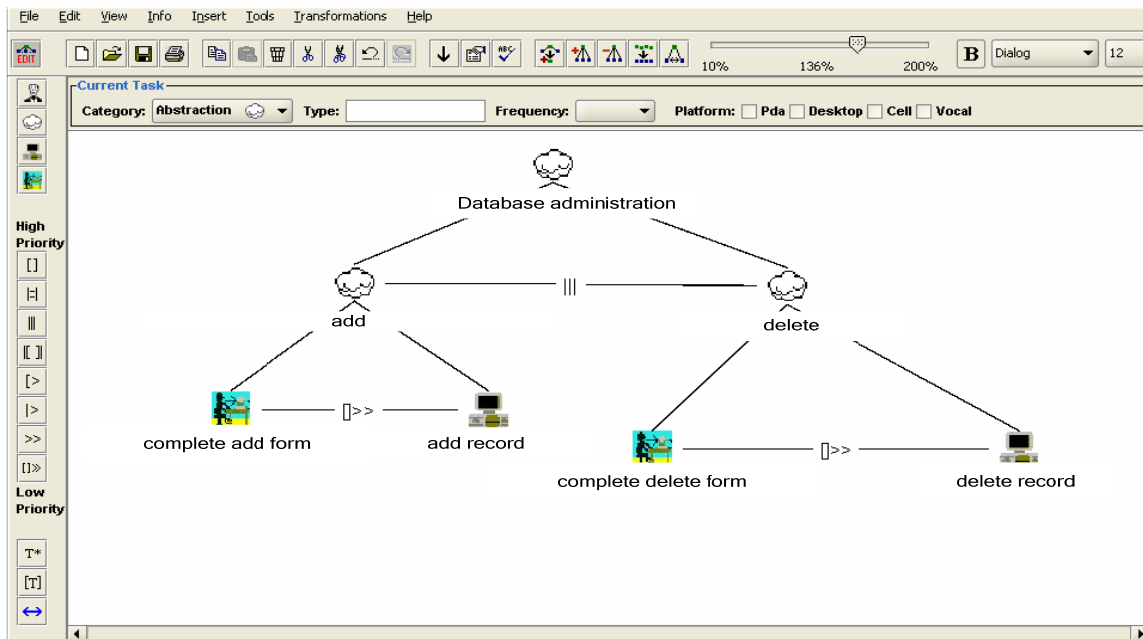

Fig.3. Database administration

The database administration has the associated root node, which is of abstract type. It has the two components shown in Fig. 3, namely the adding and deleting of data, which are also modeled by abstract nodes, since they do not include a single concrete action in terms of user-computer interaction. As a general principle, the interaction with a database must allow adding and deleting of records. Between these two types of operations, a temporal order can not be established, because we can not firmly say that one precedes the other.

The Admin Module has as a purpose obtaining some identification information: username and password, to limit the access to the administration area. This module's functions have the role to search in the database the existing of the inserted username and password. If this record is found, the access to the following website's pages is allows, else the access is denied. This module has as a purpose the realization of the available adminis-

trator's actions: delete domain and delete test.

This module's functions have the role to search in the database and to identify the existing of the record for the domain name or the test name which is to be deleted and to actually make the deletion in the database.

The available functionalities for the database are the following:

✓ Adding into the database: it's made through the AddInfo Module, which allows introducing some records or fields containing the student's name, the domain's name or a test name and through the sub-module EditQuestion (subordinated to AddInfo and IdentifyTest modules) which allows the adding of a question to the database. The adding of a question it's practically made adding to the fields the question's number, the number of points, the possible answers and the correct answer fields.

✓ Extracting information from the database : it is realized through the modules :

– IdentifyTest module and its sub-modules based on the information introduced by the user i.e. domain name and test name and it is searched in the database the corresponding record. The sub-modules use the information from this record to make some actions: displaying current test (ExtractTest), timing the past time based on the field which contains the set time for this test (TimingTime).

– Eval module**,** which allows extracting the correct answers and the answers provided by the student for each test's question as the points given to each question.

✓ Deleting information from the database: it is realized through the DeleteQuestion module's sub-module (subordinated to the identifyTest module) which eliminated from the database the corresponding fields of the question to be deleted.

✓ Modifying information from the database: it is realized through the sub-modules EditTime**,** whith the purpose to update the value of the database's field corresponding to the allocated points for a question.

The neccessary resources for the database access are compatible to MySQL.

4. Conclusion

The major principles of a E-learning will be sharing and reusing the learning objects, while still protecting the copyright law. The learners already want flexible access to a particular learning object and more control, so they will be able to select the wanted object and to create a customized course especially for them. To facilitate the effective learning, before starting an e-course, a learner must be tested if he can understand the content and to handle the technical issues and also to select the appropriate e-learning content for him. Improving the evaluation of a learner, his weaknesses, his performances and adopting strategies for this will be a future challenge for e-learning and for an intelligent agent who will customize the learner's courses according to his profile [4].

It is anticipated that in the next few years security will receive more attention in the e-learning context, therefore are already made improving in the campus networks to protect personal information of students and to stop the copyright breaking through P2P file sharing.

The e-learning market has globally expanded in both academic and commercial organizations and the demand for it is rapidly increasing, as well as the demand for effectiveness coming from trainers and learners and new applications driven by advanced technological tools are being developed.

Lately, E-learning system became a widely-used to improve presence teaching and users and administrators became aware of the need to security and dependability. However, new special measures for e-learning content must be taken as the teachers need to protect their work against copyright breaking and against the cheating students too [17].

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