TRENDS OF INTEGRATING THE E-LEARNING PLATFORM IN THE GRADUATE AGRONOMIC EDUCATIONAL SYSTEM IN ROMANIA

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Abstract: The paper presents a part of the results of the research performed in 2007 and 2008 concerning the modern way of learning and development of professional abilities by using an e-Learning platform especially conceived for this purpose at the University of Agricultural Sciences and Veterinary Medicine in Cluj-Napoca, Romania. At present, the e-Learning platform is operational and online at: http://sabinafunar.ro, and is unique in the agronomic field in Romania. The platform, which is the object of the research, has already few hundreds of users, most of them students in three universities with many faculties, a few courses and three forms of learning: daily, reduced frequency and distance learning. The present paper makes the synthesis of the one-year experience regarding a few variables to be analyzed: the efficiency of the e-Learning system compared to the classic learning system; the effect of the diversification strategy for the e-Learning platform modules on universities, faculties, courses and forms of learning; the degree of student’s involvement dependent on the domain of study, faculties and universities. The work refers also to three components of the security of the e-Learning system: vulnerabilities; classification of attacks; new methods of prevention of the attacks and diminishing the vulnerabilities of the e-Learing System. Finally, the work proposes quantifiable indicators for measuring the security degree of the e-Learning system and makes appreciations about foreseen trends in this field.

INTRODUCTION

The work presents a part of the results of the research performed in 2007 and 2008 concerning the modern way of learning and development of professional abilities by using an e-Learning platform, especially conceived for this purpose at the University of Agricultural Sciences and Veterinary Medicine in Cluj-Napoca, Romania. The work is based upon an existing e-learning platform launched online in December 2006 and hosted on our own server.

The work is motivated by the deficit of studies referring to the possibilities offered by the learning system throughout an e-learning platform in the Romanian agronomic academic environment and by the existing gap between the academic educational system and the current needs of the working market.

The aim is ameliorating the content of the curricula and syllabuses for the targeted disciplines (Marketing, Stock Exchange, Banking, Banking Operations Techniques with specific for the agronomical education), by synchronizing them with the economical development tendencies and developing abilities and competences in accordance with the current requests of the working market.

These objectives implied a research intended to evaluate the impact of the e-learning platform on the students’ knowledge, professional abilities and competences.

Context. The idea of an e-learning platform appeared in the context established in 2000 by the European Union, which launched the e-learning initiative to integrate all information and communication technologies into education. One of the main goals was that by the end of
the year 2005, all universities should have virtual campusses, where students and researchers alike will have access to on-line learning, but not to replace the existing learning system. The project is included in the European project (published in 2005) for developing a digital economy named i2010: European Information Society 2010.

MATERIALS AND METHODS

At present, the e-Learning platform is operational and online at: http://sabinafunar.ro, and is unique in the agronomic field in Romania.

The modules of the platform aim at subjects as Marketing, Agro-Alimentary Marketing, Stock Exchange, Banking and Banking Operations Technique. These subjects are the specialty of the professor co-author of the work and we developing it by integrating other subjects. For this purpose we have recently applied for a Romanian-European Research Granting Fund.

The University of Agricultural Sciences and Veterinary Medicine Cluj-Napoca, Romania, where we lead our study has an institutional site, but it does not have e-learning tools integrated.

The goals of our platform are: optimizing the synchronous and asynchronous communication between students and professors in order to develop professional abilities through an e-learning platform; developing the students’ general abilities and competences (communication and teamwork) and the specific ones, according to the effective needs of the work market.

Structure and elements of the platform. The existing e-learning platform is built on a Moodle (Modular Object-Oriented Dynamic Learning Environment), which is a system used in 185 countries with almost 28000 active sites, built in 75 languages (source: www.moodle.org, accessed in 26.06.07). In Romania, there are 70 sites constructed with this system, including our platform.

Available infrastructure:

- server: Pentium P3000, Dual Core, 80GB HDD, 1GB RAM, used only for the e-learning platform
- UPS (uninterrupted power source)
- free educational license Cpanel (www.cpanel.net) obtained on 22 February 2007– software for the server administration, maintenance and uploading. IP licensed: 194.102.73.70
- software license for the e-learning platform offered by Moodle.org, installed on server and in function. Moodle is a content management system (CMS), free software, under Open Source license, used in over 30.000 educational websites in the entire world, from over 185 countries.
- online access to server, in our University network; the platform is visible online 24/24 hours.

Research will be aimed on two convergent directions. The first direction has the purpose of studying the impact of the e-learning system on the learning process and the results of learning, communication, research and vocational integration, while the second refers to three components of the security of the e-Learning system: vulnerabilities; classification of attacks; new methods of prevention of the attacks and diminishing the vulnerabilities of the e-learning system.

One important peculiar feature of the e-learning method, as a modern psychopedagogical technique is that by using virtual features (random lessons, emotionally implicating the students, getting their feedback promptly and immediately) the students’ motivation can be constantly sustained. Using this feature, we intend to give students a better
opportunity (during university and after graduating), in a society where competition on graduates job market becomes more intense than ever. We appreciate that the ones that have acquired professional skills faster during schooling (including in the virtual space), will have better opportunities.

RESULTS AND DISCUSSIONS

Analysis of Traffic. Investigating the statistics provided by www.trafic.ro (a Romanian traffic monitoring system), an image of the actual status of the platform visibility was inferred from the following data (Table 1):

<table>
<thead>
<tr>
<th>Referrer</th>
<th>Visits</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>NONE (Direct URL)</td>
<td>429</td>
<td>50.53%</td>
</tr>
<tr>
<td>Search Engines</td>
<td>266</td>
<td>31.34%</td>
</tr>
<tr>
<td>Web Mail</td>
<td>112</td>
<td>13.19%</td>
</tr>
<tr>
<td>Unknown</td>
<td>25</td>
<td>2.94%</td>
</tr>
<tr>
<td>moodle.org</td>
<td>8</td>
<td>0.94%</td>
</tr>
<tr>
<td>stat.trafic.ro</td>
<td>5</td>
<td>0.59%</td>
</tr>
<tr>
<td>Other sites</td>
<td>5</td>
<td>0.59%</td>
</tr>
</tbody>
</table>

The platform has 441 users (06.03.2008) and it has a medium position in the above mentioned traffic monitoring system (position 622 of 1418 evaluated educational sites).

The statistics is quite typical, in proportions if not in volume, for all months considered: half of the site’s visitors know the address by heart and type it directly; a third come from search engines (99.95% Google), and 13% (to 17% in other months) access if from their webmail (read Yahoo Mail). An insignificant number of visits origins in other websites (some of them being the traffic ranking reporter). With an average visits per day rate of 18.34 (max. 36 visits one day), one can deduce that the visitors of the platform are its users, the actual students to which the course is being thought. These figures picture a very low visibility of the site nationwide/worldwide, also confirmed by Google’s PageRank of 2/10.

Having an operational eLearning tool, tested for 18 months, the next step is to open it to the great public, targeting in the first place on Romanian audience of students in marketing. Some targets were drawn in order to increase the platform’s impact on the Romanian universitary environment:
A. a minimum 4/10 PageRank of the site root,
B. a “Top 5” SERP (Search Engine Result Pages) for some Romanian keywords (course marketing online, marketing tutorial, postgraduate marketing course)

The means to achieve these objectives is by performing SEO (Search Engine Optimization), by two means:
I. Include the site root in relevant pages (Partner universities, students Blogs, Wikipedia, etc.) by creating 100 entries at partner sites. That would create an estimate of 30 to 60 BackLinks in Google, and increase the PR.
II. Populate the site with an eLibrary containing not only scientific articles, but mostly quality student’s work (projects, essays) in electronic (PDF) format, in order to enrich the site’s content (without putting too much pressure on the web administrators).

Without requiring too much effort and workload, these measures will at worst fail to produce the targeted PR (or keyword relevance) but still provide a “golden mine” of
knowledge for the existing students base. At best they will push the platform into the top for the Romanian university audience (in the fields of Agronomy, Economy and Marketing).

The impact of the e-learning system on the learning process. Being of a relative recent date in Romania, this education and communication system make that the studies regarding the impact and the consequences of its applications in the superior learning, have referential data in the theoretical field rather than in the practical one; as far as it concerns the Romanian agricultural learning system, it seems that there is no such study and this platform seems to be the first appeared in Romania in this field. Therefore it appears stringent the development of such a study regarding the impact of this learning system.

The e-learning platform does not assume the absence of any physical contact between students and teachers; it is rather seen as a complementary teaching method. This method is meant to facilitate the teaching, to develop general communicational skills and professional competences, to disseminate information to students in a synchronous and asynchronous way.

This virtual learning environment will help users build a new type of education and form professional competences by offering the possibility of simulations of the various situations from the real socio-economic environment.

Our intent is to study and to offer answers to the questions referring to the quality of education, student and post-graduates schooling, by offering transfer of knowledge and also employment and relational possibilities, to enable them to be competitive in the business environment.

We intend to improve the syllabuses’ content for the courses of the platform, to synchronize them with the tendencies of the economy; to develop abilities and competences in accordance with the labour market; to study the impact of the e-learning system on the learning process and the results of learning, communication, research and vocational integration.

In order to evaluate the impact of the e-learning platform on the students’ knowledge, professional abilities and competences and to obtain the feedback of this innovative didactic activity, we organized a group interview. We have elaborated a questionnaire with the goal of analyzing the students’ opinion, implication and satisfaction level.

The poll conducted between 01.03.2008-06.03.2008, on a sample of 42 students of the University of Agricultural Sciences and Veterinary Medicine, Cluj-Napoca, Romania who used our e-learning platform tried to observe the following variables:

- the efficiency of the virtual system in comparison with the classic one.
- the effect of the courses (modules) diversification strategy of the Platform, aimed to develop professional skills and competences
- the implication level of the students
- the satisfaction level of the students
- the performances of the platform in the studied courses

The answers to this question „How do you evaluate the the e-learning system, in comparison to the classical one?“ revealed that the majority (85%) appreciate the e-learning system as better or complementary necessary in comparison to the classical one. This answer proves the interest of the students towards the e-learning system in general.

The question „Evaluate the degree in which the e-learning platform helped you identify the professional skills and competences necessary in the agronomic field“ revealed that 67% of the students found the platform „Helpful“, 6% „Very much helpful“, 17% „Little helpful“, while 10% did not answer the question. The answers to this question reveal that our platform needs to be improved in order to help students identify the requested professional
skills and competences and better orientate on the labor market.

The question „Has the platform made you understand the job profiles in the agronomic field“ revealed that 88% of the students appreciate that the platform helped them understand the job profiles in the agronomic field, 10% appreciated that the platform did not help them understand the job profiles, while 2% did not answer the question. These answers portray a good orientation of the platform in the sense of helping student identify job profiles in their field.

The answer to the question: „Evaluate the utility of the platform on a scale from 1 to 10“, revealed that 26% of the students evaluated the platform with 8; 24% with 9; 24% with 10; 14% with 7; 12% with 4. These answers prove a positive appreciation of the platform utility.

As the answer to the question „Did you find the e-learning platform useful for preparing the Banking Operation Techniques exam?“, was in a great proportion (89%) „Yes“, we appreciate that the platform reached its objective of supplying the students a supplemental support for preparing the exams.

Security of the e-Learning system. Another direction of the present work is referring to the e-learning security system: study of the e-learning system vulnerabilities, analysis of the attacks typology on the e-learning system and proposals of new methods of prevention of attacks and diminishing the vulnerabilities of the e-learning system.

Some identified vulnerabilities are:

A. External:
1. DDOS (Distributed Denial of Service) – an attacker commands more computers connected to Internet using a high-speed connection to Ping our server, in order to lock it (jam the network card, or block the legit traffic). Ping sometimes has higher priority than other protocols (HTTP).
2. Search-SPAM: similar to the DDOS attack, a hacker may submit a lot of “dummy” searches using our internal search engine, mostly using two or three letter words with high frequency (such as “of”, “for”, “and”, “in” etc. – or their Romanian counterparts). The result pages being many, these searches consume the most CPU time, both by Apache web service, PHP page generator and the MySQL database server.

For the moment there is no protection for such attacks. The proposed measures are:
- an imposed delay of 5 to 10 seconds between searches
- restricting the number of searches per IP per hour
- IP monitoring, identification of attacks and backtrace to attacker. Permanent ban of these IPs.

B. Internal:
Students may install keyloggers on labs’ computers, steal teachers’ passwords etc. They may modify their own grades, or others’. Prevention of “leaked passwords” attacks is more difficult and implemented by the following policies:
- 2-weeks password expiry
- Daily database backup
- Logging of all “administrative” actions, backtrace.
- Paper copies of grades and official info.

CONCLUSIONS

The results of the present work, by which we tried identifying the trends in the Romanian e-learning agronomic academic educational environment, lead us to the following
conclusions:
1. The agronomic academic e-learning field in Romania is at an incipient phase.
2. The e-learning platforms are means to improve the classical learning systems.
3. As the e-learning platforms are new elements for many countries, the educational field should attribute a growing importance to their development. The dissemination of the experiences of developed countries in this field is expected by the developing countries in order to create a harmonious development.
4. The gap between the academic educational system and the current needs of the labor market could be diminished by implementing e-learning tools in order to adapt the curricula towards the needs of the students.
5. Through this system, the open methods of learning will be harmonized, giving the student the possibility of building his own knowledge by using information and communication techniques.

The trend for the development of the educational field in the 21st century is ascendant; the new improvements and developments of the e-learning platforms should be disseminated as fast as possible in order to be useful for the society.

Future possible directions of the e-learning platform and of this study:
- Better analyzing the labor market in the field and synchronizing the syllabus content (as thematic and discipline proportion) with the determined tendencies
- Obtaining the supplementary data by implementing a periodical evaluating module.
- Developing the existing virtual library in the frame of the platform
- Incorporating a real-time smart whiteboard for common debates and brainstorming.
- Building a module for publishing the results of the use of the e-learning platform (as a supplementary disseminating method) as an online magazine and organizing online conferences.
- Offering a module for learning by simulating virtually real situations.
- Inserting in the platform a software program for collecting statistical data, evaluating, and monitoring the students, professors, the courses and specializations (correlating them with the labor market) and using them form improving the offered services.
- Developing the administration module, the security of the data transfer, study of the security of the e-learning system.

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