FROM E-LEARNING 1.0 THROUGH E-LEARNING 2.0 TO E-LEARNING 3.0 IN BULGARIAN UNIVERSITIES

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Abstract: In the article are described the main characteristics and features of web-based e-Learning 1.0, 2.0 and 3.0 on the base of Web 1.0, 2.0 and 3.0, respectively. Advantages and common architecture of e-Learning 3.0 is given. The state of e-learning development in EU and particularly – in Bulgarian universities is discussed. The conclusion is that in the area of e-learning Bulgarian universities lag years behind of world achievement in norm preparation, modern web technologies introducing and teacher training.

Key words: e-learning, Semantic web, learner, semantic repository

1. Introduction

The most utilized contemporary e-learning systems are LMS (Learning Management System) or LCMS (Learning Content Management Systems) which are mainly of type e-Learning 1.0 founded on Web 1.0.

Web 1.0 (informational web, read-only web or web of static pages) ensures only content and in learning this would be similar to instructor-led classroom, where learners receive what is pushed them. In the stage of e-Learning 1.0 L(C)MS are coming into use to create, design, and manage courses, as well as supporting content delivery, user registration, monitoring, and certification tools. The focus of these systems is on *learning objects* (LO), with less consideration for the *learning process* (LP).

Web 2.0 gives an opportunity to inform, work and socialize people with one another. For learning, this would be best illustrated by a distributed team collaborating on project via social networks, group workspaces and/or communities. By Bandura's social learning theory [1] people learn from one another, via observation, imitation, and modeling. At the present time the best e-learning applications are on the base of Web 2.0 and are known as social learning or e-Learning 2.0 organized in nodes called PLEs (Personal Learning Environments). Now e-Learning 2.0, besides L(C)MS, includes blogs, wiki, e-portfolio (learner's data), social networks (YouTube, LinkedIn, Facebook, My Space and more of 7600 others) and social bookmarking (web document annotating).

From 2008 a new digital practice arises to higher education in US, namely Massive Open Online Courses (MOOCs) [3]. Recently, partners in 11 European countries have joined forces to launch the first pan-European MOOCs initiative, with the support of the European Commission. Around 40 courses, covering a wide variety of subjects, will be available free of charge and in 12 different languages (www.OpenupEd.eu), officially launched on 25 April 2013.

At present, Web 2.0 technologies haven't been fully integrated into most e-learning platforms but Web 3.0, the next development of web technologies, is here. While the mobile Web is a reality, mobile learning has yet to take off. Virtual worlds, simulations, and immersive learning exist, but remain underused by schools, universities and business.

Web 3.0 (called also Intelligent or Semantic Web) aims converting current web dominated by unstructured or semi-structured documents

into semantically annotated machine-understandable "web of data". The most notable Semantic web components are inherent of Artificial Intelligence (AI) and includes ontology- and agent-based services implementing:

- semantic search,
- natural language (NL) processing,
- machine learning and data mining,
- cloud computing and
- immersive web (which involves 3D environments, augmented reality, and virtual worlds).

Studies indicate that these components can be incorporated into e-learning. As e-Learning 1.0 and e-Learning 2.0, the emergence of e-Learning 3.0 will be strongly influenced by the technologies that will bring forth the Web 3.0 [6].

The paper is organized as follows. In the next section we propose our view about architecture of e-Learning 3.0. In Section 3 e-Learning activities and systems in Bulgarian universities are given briefly.

2. Architecture of e-Learning 3.0

Generally, e-Learning is designed and developed around a course, group of courses or specialty and is asynchronous, online, mobile, shared, student-centered and adaptive. These properties could by achieved with the resources of e-Learning 2.0, but fully adaptive, ubiquitous (anywhere, anyone and anytime) and personalized e-learning is possible only on Semantic web platform. E-Learning 3.0 system is distributed on various servers and includes (fig.1):

- semantic e-learning portal;
- learning content semantic repository with LO databases;
- L(C)MS with learner model, course syllabi, social links databases and authoring tool;
- set of social link tools.

Semantic e-learning portal although most of them do not store the educational resources themselves, but only their metadata. Therefore, it is possible to find the same resource from different repositories provides learner with access to learning content semantic repository, L(C)MS and social links. It possess advanced learning resources organization framework and search mechanism which initializes a semantic model representing the digital content stored in distributed e-learning servers through the use of ontologies [7].

Semantic repositories are web servers using ontologies as semantic schemata, which allow them to automatically reason data. They are similar to the database management systems (DBMS) and allow for storage, querying, and management of structured data. The most of them do not store the educational resources themselves, but only their metadata. Therefore, it is possible to find the same resource from different repositories [2]. It is expected that these repositories can play an important role about e-learning in the near future.

Semantic query is NL (or near-NL) query for LO extraction which is ontology-based parsed and interpreted.

L(C)MS is improved and extended with semantic instruments as data mining and knowledge extraction from repository aiming LO building and support by *Authoring tool*, as well as social links and learner progress analyzing.

Teacher is LO author and e-learning manager. Generally, LOs are two main types:

- *structural LOs*, presenting curriculum of specialty, syllabus of course, plans of lectures/lessons etc.;
- *content (or descriptive) LOs*, including learning materials as lectures, lessons or parts of them) and
- *examination LOs* (project, task, test etc.) intended for evaluation of learner knowledge.

The *learner model* database preserves the personalization (individualization) and the adaptability of the e-learning in an online learner-centered environment. It main components are learner profile (personal data), knowledge degree and behavior (learning style, concentration level, motivation, aptitude etc.) [3].

Social link tools database includes the links of participants in LP to the associated social networks.
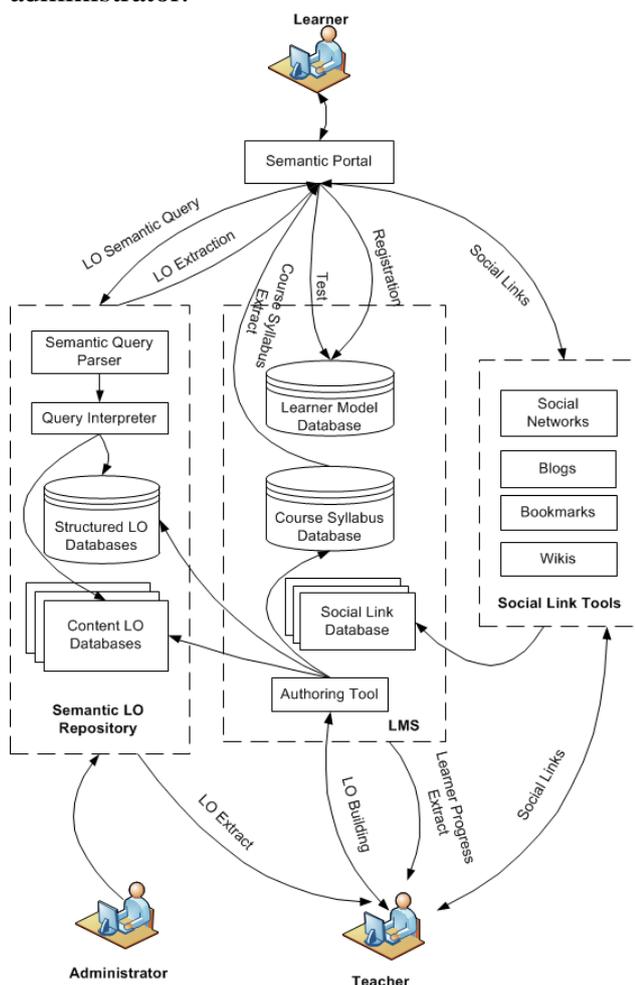
These activities are supported by administrator.

Fig.1. Architecture of e-Learning 3.0

3. E-learning activities and systems in Bulgarian universities

There is no official statistic about e-learning in European universities but in vocational training in the UK, Spain and Benelux nearly 40% of companies train more than 50% of their employees via e-learning [5]. Now in Bulgaria more of 63% of students participate in some of e-learning forms [8]. Last years all Bulgarian universities introduce intensively e-learning but they are vastly behind the time – e-Learning 1.0 is still predominating.

Moreover as far as e-learning is implemented in Bulgarian universities it is organized as blended and linear, without any adaptation to learner models.

The more of universities have special units for e-learning organization – faculties (NBU), departments (VTU, TU-Sofia, etc.), centers (SU, UNWE, SWU-Blagoevgrad, VFU-Varna, BFU-Burgas, University of Shumen, Academy of Economics-Svishtov, RU-Russe, ICU-Botevgrad etc), laboratories (TU-Sofia, UF-Sofia) etc.

On the base of University Distance Learning Regulation (2004) since 2005 the most universities develop own regulations having different particularity and quality. National norms about e-learning content development and knowledge control are missing. The Ministry of Education must to elaborate special standards for e-learning in Bulgarian universities.

Despite the undeniable advantages of e-learning, in Bulgarian universities lacks attitude for the active of use e-learning, especially among the professors. They can not overcome stereotype of traditional teaching and learning. There is some misunderstanding and apprehension of e-learning advantages. One still give preference of paper textbooks, tutorials, and manuals. Examinations and tests are very often extramural and oral with a detailed subject writing.

A positive sign is last year financing of university e-learning along the line of Priority axis 3 (Development of electronic forms and distant learning in high education system) of Human Resources Development Operational Programme.

In the next Table 1 the most used L(C)MS in the most active in eLearning Bulgarian universities are pointed out. These systems are continuously changed but Moodle is prevailing yet. Recently, LCMS Blackboard is coming rapidly at the expense of the outdated and imperfect systems.

Table 1. L(C)MS in Bulgarian universities

University name	e-learning system*
TU-Sofia	1, 3, 5
TU-Varna	1
TU-Gabrovo	1
PU-Plovdiv	11
SU-Sofia	1, 4, 8, 9
UF-Sofia	1, 2
AE-Svishtov	1
VTU-V.Tarnovo	1

NBU-Sofia	1, 2, 12,15
SWU-Blagoevgrad	1, 2, 13
ICU-Botevgrad	14
BFU-Burgas	1
RU-Rousse	3
VFU-Varna	10
University of Shumen	1
UF-Sofia	1
UNWE-Sofia	1
NDA-Sofia	6, 13
UE-Varna	13
"A.Zlatarov" University-Burgas	2
MU-Sofia	3, 15
TU-Stara Zagora	1
MU-Pleven	3
AUBG-Blagoevgrad	14
MU-Plovdiv	15
UMG-Sofia	1
UCTM-Sofia	
ULSIT-Sofia	13

* *Legend*:
 1- Moodle
 2 – Blackboard (collaborated with WebCT)
 3 - E-learning Shell (eLSe)
 4 - @RCADE
 5 – MSCS
 6 – FLAME
 7 – e-College
 8 – Accolade
 9 – Nicenet
 10 – Scool
 11 – PeU-2.0
 12 – VEDA
 13 – ILIAS
 14 – LRN
 15 - other.

4. Conclusions

In the area of e-learning Bulgarian universities lag years behind of world achievement in norm preparation, modern web technologies introducing and teacher training. E-learning standards are missing and there are no sufficient experts and advanced policies.

For the successfully implementation, adaptation and using of e-learning system in Bulgaria, there should be adopt compulsory national standards.

Only with undivided authority learning system, including e-learning, Bulgarian education could increase its competitive capacity and interest at international level.

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