

## INFORMATION SYSTEM OF THE TECHNOLOGY SCHOOL "ELECTRONIC SYSTEMS" ASSOCIATED WITH THE TECHNICAL UNIVERSITY OF SOFIA BASED ON CMS

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*The Web-based Information system of the Technology School "Electronic System" associated with the Technical University of Sofia was developed and implemented three years ago. It has the following basic modules – official part, student's module, teacher's module, and module for the ex-students of the school. Some of these modules were further developed and the work of the system was elaborated. The system was based on Apache Web server, PHP and MySQL data base. The information system has the possibility for upload of information – educational materials, list of candidates, list of exam results and so on. The upload has to be done in a very complicated way and the work done has not helped much. Every year the new circumstances often require source code changes. This makes the administration of the system too hard. The fast development of Web based technologies brought the development of tools for content management system (CMS) which make the development, management and administration of different applications in an easier way. These CMS are based on different platforms – PHP, Python, Java etc. For the solving the problems of information exchange of the Web-based Information system of the Technology School "Electronic System" a project has been developed on the base of open source content management system. The chosen product is Plone that is a free open source content management system. Plone is constructed on the base of Zope object oriented application server. On the base of Zope/Plone platform the following modules have been developed: system for creation and management of different types of users; on-line test system; information module for applicants; ex-students' registration and communication. The information system of the Technology School "Electronic System" is further developed and elaborated for it's further usage.*

**Keywords:** electronics, e-learning, information systems

### I. Introduction

The Web-based Information system of the Technology School "Electronic System" associated with the Technical University of Sofia was developed and implemented three years ago. It has the following basic modules – official part, student's module, teacher's module and module for the ex-students of the school. Some of these modules were further developed and the work of the system was elaborated. The system is based on Apache Web server, PHP and MySQL data base [1].

The information system has the possibility for upload of information – educational materials, list of candidates, list of exam results and so on. The upload has to be done in a very complicated way. Some further development of this particular module has not helped much. Every year the new circumstances often require source code changes. This makes the administration of the system too hard.

The fast development of Web based technologies brought the development of tools for content management system (CMS), which ensure the development, management and administration of different applications in an easier way. These CMS are based on different platforms – PHP, Python, Java etc.

## **II. Information system structure and functionality**

The information system of Technology School “Electronic System” associated with the Technical University has been developed with the following basic modules – official part, student’s and teacher’s module, and administrative module [1].

The official part has the purpose to present the school with its history, its development, description of the professional education and so on. In the official part the application procedures for the school are described. From text files - the list of candidates, their results in the exams and the final results could be uploaded. The advantages of the official part are the quick and easy access to each page and the ability for the applicants to look up the exam results and admission. The disadvantage of this module is that the upload of data has to be done in a very complicated way.

The student’s and the teacher’s module realizes faculty and students communication, sending messages, information and curricula exchange, discussions forum, subject matter and course work. The student’s module has been designed to assure the ability of the students to reach to the lecturers’ information. The only way for the student is to download the information. There is no possibility to overview the information in advance.

The teacher’s part has been developed for the lecturers in order to give them ability to upload information - lectures, tests and other materials. The disadvantages in this module are that any lecturer can access the information uploaded from another lecturer with a password, no contents of the realized uploads, possibility to upload only in few fixed file formats.

As first steps for improvement of the system [2] the following have been developed:

- module for creating new type of users for the ex-students of the school with specific functionality for the ex-students;
- elaborated approach for the data exchange between the Information system for student reception and the Internet based information system;
- development and integration to the Internet based information system a new module with knowledge and skills testing system.

These new modules and the improved data base structure have visibly elaborated the work of the information system [3] but the disadvantages in the download of information and in the further growth of the system have remained. All these enforced the development of new structure and functional variety and additionally change of the platform of the system.

The structure of the information system of TUES has the following basic modules – official part, categories of users- students, teachers and administrators, e-learning system and software and hardware resources (Fig. 1).

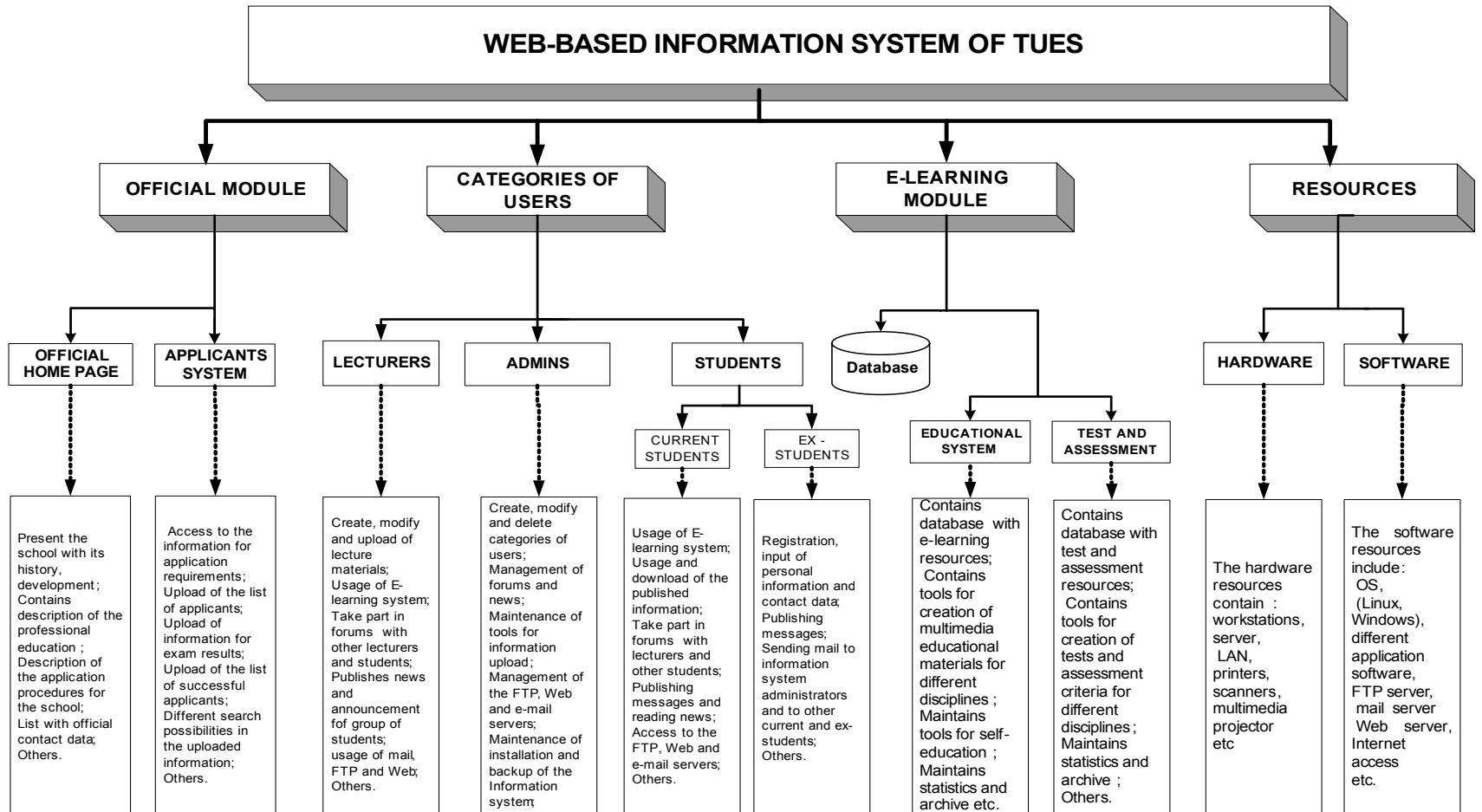


Fig. 1 Information system structure and functionality

The official part has the purposes to present the school history, the development of the school, description of the professional education etc. In the official part the application procedures for the school are described. From text files (output of the school information system for applicants) - the list of candidates, their results in the exams and the final results could be uploaded.

The defined categories of users are – lecturers (teachers), students and administrators.

The student's and the teacher's module realizes faculty and students communication, sending messages, information and curricula exchange, discussions forum, subject matter and course work. The student's module has been designed to assure the ability of the students to reach to the lecturers' information and use the e-learning system module.

The teacher's part has been developed for the lecturers in order to give them ability to upload information - lectures, tests and other materials. They are also able to create, modify and publish multimedia educational materials in the e-learning module of the information system.

The administrative module of the system has the ability to add, modify and delete categories of users, control the forums, news, e-mail, FTP, Web servers.

The e-learning system contains tools for creation of multimedia educational materials for different disciplines in the Technology School "Electronic System". It maintains tools for self-education and test system for knowledge and skills assessment.

The module resources contain hardware equipment – workstations, server, LAN, printers, scanners, multimedia projector etc. The software resources include OS (Linux, Windows), different application software, FTP, mail and Web servers, Internet access etc.

### **III. Information system of the Technology school "Electronic systems" associated with the Technical University of Sofia based on Zope/Plone**

The variety of newly developed Web based technologies and the development of ready-made tools for content management system (CMS), ensures the management and administration of different applications in an easier way. The CMS as a platform for the Information system of the Technology School would be appropriate from the point of view that the teams used for the further development of the system often change.

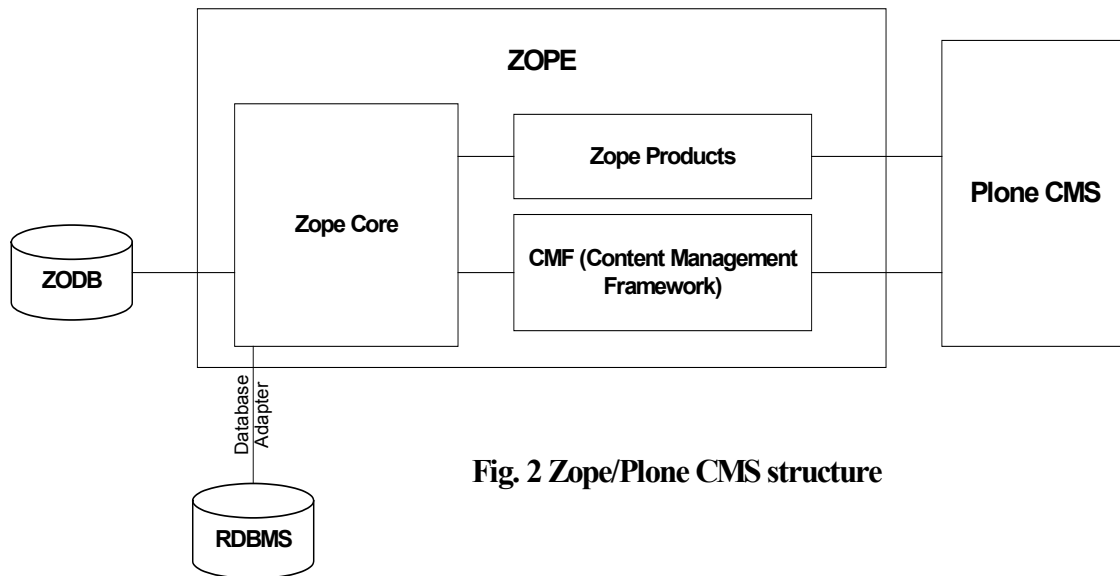
For the Web-based Information system of the Technology School "Electronic System" a project has been developed on the base of open source content management system. The chosen product is Plone that is a free open source content management system. Plone is constructed on the base of Zope object oriented application server (fig. 2)

ZOPE contains Zope Core, Zope Products and CMF (Content Management Framework). Zope Core maintains different tools for management of system content, management of users and standard API for development of Zope products. Zope core

is able to maintain from practical point of view every relational database using a specific for the purpose Database Adapter (DA). There is a numerous amount of developed products. Among these products is the CMF that contains standard tools for document workflow management.

PLONE CMS is a content management system based on CMF product. This construction gives the opportunity for:

- standard tools and instruments for content management;
- possibility of standard users management – creating of a new user, modifying of the user's rights, deleting a user;



**Fig. 2 Zope/Plone CMS structure**

- usage of variety of ready-made modules for Plone / products for Zope - placing various functionality at users disposal:
  - forums
  - web based e- mail system
  - web based modules for content edition
- standard tools for management of the whole system using web based interface;
- standard API for development of new modules/ products and for their integration in already constructed system.

Because of the above listed advantages of the Zope/ Plone platform it has been chosen for further development of the Information system. Modules for creation and management of different types of users, on-line test system, information module for applicants and ex-students' registration and ability for communication.

On the base of Zope/Plone platform the following modules have been developed:

- system for creation and management of different types of users;
- on-line test system;
- information module for applicants;
- ex-students' registration and ability for communication.

#### **IV. Conclusion**

The Information system of Technology School “Electronic System” associated with the Technical University has been developed and used for a couple of years. The further development of the system has elaborated its work but the disadvantages remained. This forced the need to change the platform of the system and to precise the functionality.

On the base of the newly chosen platform - Zope/Plone has begun the construction of the Information system with the following modules - system for creation and management of different types of users; on-line test system; information module for applicants; ex-students' registration and ability for communication. These modules follow the developed functionality of the system.

#### **V. REFERANCES**

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