

Collaborative Educational Systems in the Virtual Environment

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Abstract: *The work leads to an original approach to the construction of collaborative systems metrics. The approach is based both on research already conducted by the author, on the experimental results obtained, and the foundation taken from the specific literature. The collaborative systems in knowledge-based economy are formalized and their characteristics are identified. The virtual campus structure is described and a comparison with the classical university is achieved. The architecture of virtual is designed and the categories of agents in virtual campus are analyzed.*

Keywords: *virtual campus, collaborative system, learning, structure, architecture.*

1. Introduction

The existing collaborative systems are developing constantly because:

- waiting threads, specific to all processes in which serving activities and waiting times occurs, are restructuring due to teleactivities and to the access generalization to distributed applications;
- the weight of elements that characterize the decision making process changes due to enrichment of information on which decisions are taken;
- the number of intelligent agents is increasing and their presence in the structure of complex dynamic systems diversifies;
- the production costs are reduced and the quality is improved by using more the analysis and computer-aided simulation;
- better products are built, more innovative, with higher quality and that allow rapid launch on market.

There are many implementations of collaborative systems in the economy, in different areas of interest and in both environments: real and virtual.

In the real environment, there are many types of collaborative systems, the most important being the collaborative banking systems, collaborative educational systems and collaborative systems in production.

In the virtual environment, the collaborative systems implemented are represented by the virtual campus, the virtual bank, the virtual enterprise for software development and the virtual enterprise for produc-

tion processes.

2. The virtual campus

The virtual campus refers to an effective collaborative system in which people and equipment cooperate in order to achieve certain objectives [2].

The virtual organization represented by the university campus is a collaborative educational system, whose role is to develop processes in which teachers post lessons and courses [3], realizes tests bases, organize schedule of evaluations. In the virtual campus, a student register for courses, participate at examinations and receives notes.

The main objectives of the virtual campus are the development and diversification of online education for all forms of learning, activities that takes place in the e-learning or m-learning platform of the university, providing logistical support, monitoring the e-learning activities, training of participants and development of electronic guide of students and teachers.

Teachers involved in the development, implementation and materials posting on the e-learning or m-learning platform can access online guides regarding the realization of an electronic course and the use of platform.

The m-learning platform of collaborative educational system allows the distribution of courses in text, graphics and multimedia formats, contains elements of synchronous and asynchronous communication and advanced testing systems.

The virtual campus includes specific work procedures and tools that facilitate self-study, with different and easily accessible means. Architecture used facilitates the access to m-learning platform of all registered users, regardless of where the access was requested.

The virtual campus promotes a set of quality standards for evalua-

tion of educational services offered and for assist students, by providing them detailed information, available in electronic form, regarding the activities that take place within each course.

Many education institutions do not have the resources and infrastructure needed to run top e-learning solution. This is why Blackboard and Moodle, important players in the field of e-learning software, have versions of the base applications that are even cloud oriented.

3. The structure of virtual campus and comparison with classical university

The virtual campus is an organization built for the development of online educational processes for all levels of training.

The virtual campus has internal components, like students, computers and portals, and external components, such as databases and teachers. The virtual campus structure includes the components in Figure 1.

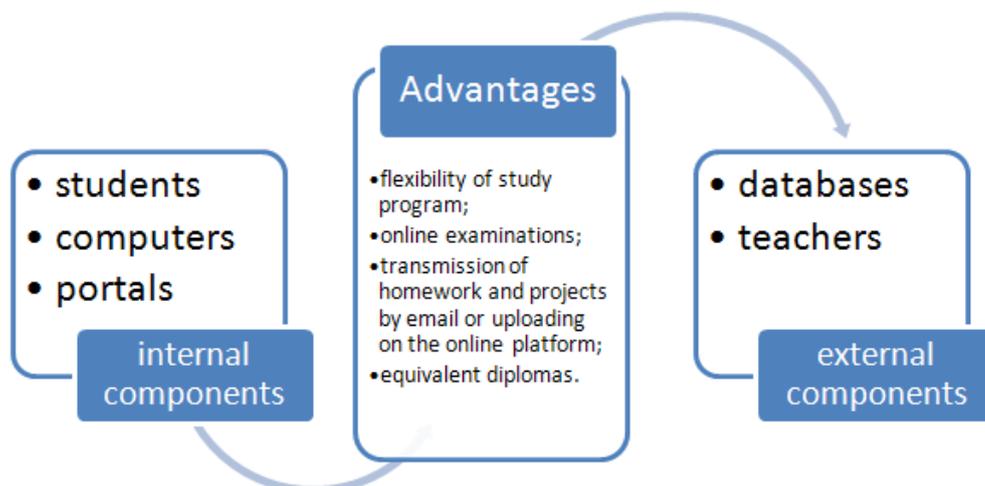


Figure 1— Structure of virtual campus [9]

Flows developed in the virtual campus aims educational activities by submitting homework and developing projects by students, evaluation of students' knowledge, and discussions on the campus associated platform.

Entries are given by students enrolled, projects developed, homework submitted for evaluation, courses posted on the platform. The outputs are represented by graduate students, diplomas, projects submitted.

The activities carried out are displaying courses on the platform, consulting materials support, ongoing self-study, development of homework and projects, achievement of test bases, organizing assessment calendar, and knowledge evaluation.

In Table 1 are compared the elements of classical university and virtual campus.

Table 1—Comparison between classical university and virtual campus

	Virtual campus	Classical university
Objective	development of online education for all forms of learning	increasing the quality of educational process
Structure	includes internal and external components	includes internal and external components, buildings, equip-
Flows	carrying out educational activities	carrying out educational activities
Entries	students, projects, homework	students, projects, homework
Outputs	graduate students, diplomas, projects	graduate students, diplomas, projects
Activities	conducted online, on the e-learning platform	conducted physically, at the university

Virtual campuses are already a reality, taking into consideration the progress made in e-learning and web technologies, in the collaborative and distributed systems, in the broadband communications and considering

the collaboration needs of universities to offer common programs of study [4].

4. Architecture of the virtual campus designed as a collaborative mobile learning system

The virtual campus designed to support mobile learning processes offer an innovative and interactive online platform for mobile learners, by utilizing the location services and other sensory components built-in mobile devices. On the online platform, the mobile learners can learn collaboratively and interactively either at a distance or face-to-face in the mobile learning environment [5].

According to [7], the architecture of collaborative mobile learning system includes the followings components: course authoring system, learning management system and learning content management system. These components are presented in Figure 2 [9].

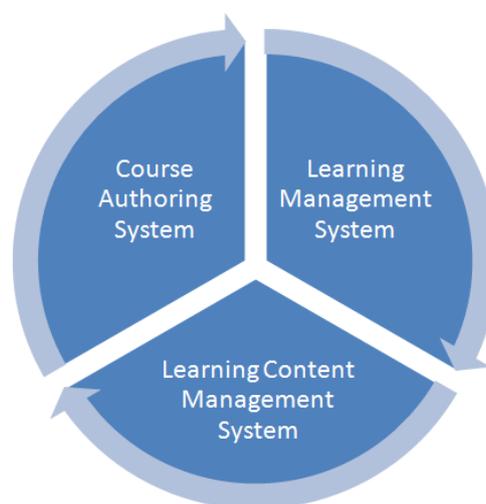


Figure 2—The functional model of collaborative mobile learning system

The online platforms in the field of mobile learning have been constructed taking into consideration the connection with the elements used

in the learning activities, such as learners and mobile technology users, and the control components in the learning activity system [6].

The virtual campus is implemented on a communications infrastructure that allows simultaneously and stable access of many users and that properly manage different electronic formats of educational resources.

An agent from the mobile virtual campus is an entity that interact or exchange information in the collaborative system, be it people or applications. In the collaborative learning process, using e-learning or m-learning, there are five categories of agents:

C_1 – *student*, which obtains information and translates it into knowledge;

C_2 – *information provider*, that facilitates the process of converting information;

C_3 – *designer*, which process the information so as to be easily absorbed;

C_4 – *instructor*, that assists the student in the conversion process;

C_5 – *manager*, that provides an easy context to the process.

Figure 3 presents the agents of collaborative learning process in the mobile virtual campus.

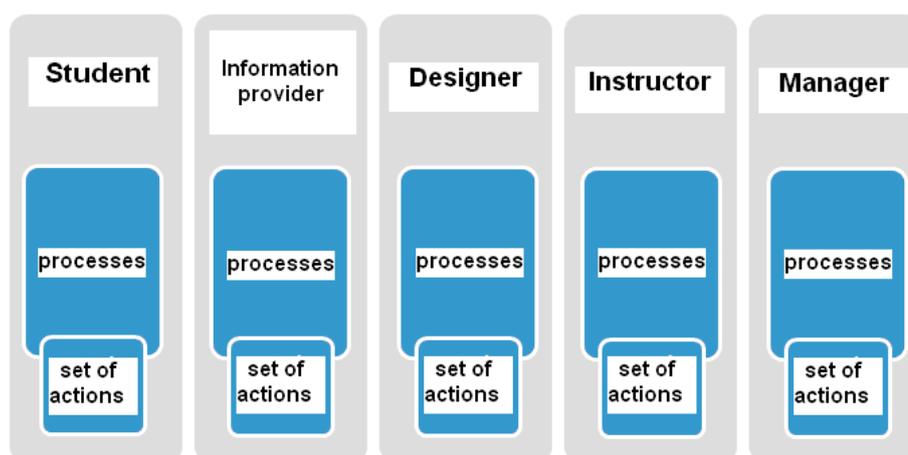


Figure 3—The categories of agents in a mobile virtual campus

Every agent role is seen as a group of processes that the agent is able to execute. Each process is a set of actions that a user performs during the interaction in the virtual campus. A process is a way to use the collaborative system. The full set of available processes defines the scope for which the collaborative system is used and requires a specific configuration.

5. Conclusions

A virtual campus that supports mobile learning processes is a collaborative educational system oriented to all partners, such as teachers, learners and administrators.

The development of virtual campus as a collaborative system is accelerated, along with the extension of wireless networks and must be taken into account that the quality characteristics become strictly related to the security characteristics.

The learning process from a collaborative mobile learning system can be achieved through an internet mobile learning platform. The collaborative learning system should focus on how to instruct and stimulate mobile learners to achieve knowledge, and the system to simulate traditional classroom education and learning environment [8].

Treating economic phenomena using collaborative systems lead to increasing the efficiency within the organizations, irrespective of architectures defined. Developing collaborative systems determine the increase of their complexity and the global character of the economy is meant to impart a general character for collaborative systems developed.

One working direction is using e-learning solutions over the cloud. There are many benefits from using the cloud computing for e-learning

systems. Also, there are some disadvantages that have to be taken into account.

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