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USING CLOUD SYSTEMS TO FACILITATE INTERACTION IN HIGHER EDUCATION TEACHING AND LEARNING ACTIVITIES

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Abstract

Most students and teachers use the Internet not only for social purposes, but also for virtual interaction in the teaching and learning process and searching for information. We believe that cloud systems, during the financial period we are not traversing, through the natural advantages they have, may support the interaction used in education in the teaching and learning process. The purpose of our article is to present those advantages of cloud systems which positively influence interaction in the learning process and promote this connection in the development of school education.

Key words*:* cloud computing, interaction, virtualization, school education

Introduction – cloud computing in education

The recent development of technology has led to substantial changes in the Internet, that is, from simply accessing and reading of web pages to running more complex software applications. Thus, interaction has become one of the main key elements in communication, development and information. As communication, development and information are the most important actions in the learning process, we can say that interaction, at the virtual and natural level, is necessary in this process. Thus, the evolution experienced by the Internet service led to large amounts of data storage in the cloud. This decision meant a significant step towards the evolution of Romanian education. And in this way, cloud services have promoted the benefits to school education by software applications such as: Amazon, Yahoo, Google etc. We consider that the development of students should not be made only on a professional level, but also at the level of using

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technology, all these emphasizing the formative function of the teaching process, meaning that professional training which provides continuous integration of the graduates in the social and professional life.

Cloud computing - general characteristics

Buyya et al, 2008, define ***cloud computing*** as: a type of parallel and distributed system consisting of a collection of interconnected and virtualized computers that are dynamically provisioned and presented as one or more unified computing resources based on a service-level agreement'. According to this definition, we can state that these cloud systems become a convenient source of usage during the financial crisis. As it has become a general term for the IT solutions, it was found that the systems provide resources and not infrastructure through the industry suppliers. The success of this distributed system is represented by its natural components, i.e. those reusable and interchangeable components which can be customized, scalable and extensible (Vouk, 2008).

Foster (2008) categorizes cloud computing as a real business. Cloud allows SMEs to avoid the costly hardware and paying for the staff training courses (Foster, 2008). This saving of IT infrastructure and staff is also extremely beneficial in the Romanian school education. If SMEs use this as a domestic policy of saving its own budget, why not the Romanian education benefit from this? For Markus KLEMS (2008) cloud computing represents those properties of scalability and optimum use of resources. In the view of other authors, these features were not essential for the infrastructure to be cloud. They have emphasized more the business model (collaboration and pay-as-you-go) and the reduce of capital expenditures. (Jeff Kaplan and Reuven Cohen, 2008).

Richard Katz, Phil Goldstein and Ron Yanosky (2009) pointed out in their article *"Cloud Computing in Higher Education"* the following important aspects of cloud systems, aspects that influence education and the education system: reducing the cost of IT equipment in higher education (where the Internet demand is substantial), further promotion of IT standards, IT scalability, the reducing of IT supply bottlenecks, ease of data access. We believe that these are just some of the advantages that cloud systems offer and, therefore, in order not to exclude a pointof view, we will analyze all the advantages that are presented in the literature of the field, then analyzing that particular oneswhich are efficient and profitable for the functioning of the educational process.

The advantages of cloud computing

Cloud computing offers a number of advantages described in theory and effectively applied in daily practice: desktop support, mobility and flexibility, cost and operating advantages, scalability, software support, business agility, device and independent location (Coombe, Cloud computing - Overview, Advantages, and Challenges for enterprise deployment, in 2009, December). We will briefly present these benefits in the Table 1, as they appear in the view of this researcher.

Table 1. *The analysis of the advantages of cloud computing*

Advantages	Benefit description	Pro/Against Romanian Education
1. Desktop Support	Cloud systems are able to reduce the cost of traditional desktop virtualization and desktop services. They also allow the final user to be independent of hardware and they strictly access necessary equipment.	This first advantage refers to the ongoing and effective functioning of the educational process. Cost reduction of desktop applications is also a benefit for education which is also going through a financial crisis. Furthermore,the network administrators of the educational institutions of hardware are no longer responsible for the hardware, this being provided by cloud computing systems suppliers.
2. Mobility and flexibility	Cloud infrastructure provides mobility and flexibility, meaning that it offers the same type of services with resources from different locations. Thus, the beneficiary receives the documents anywhere, either at work or at home, the services being of the same quality regardless of location, just like accessing a computer connected to the Internet.	The second advantage specific to the cloud systems directly supports the educational process. Students, teachers, the administrative staff need access to data quality achieved through quality services and efficiency. Balanced and agile access to data provide the educational staff high quality and interaction communication. Making it easier for their preparation and better information they provide the results at the end of the educational process represented by the graduates.
3. Cost and operational advantages	For large enterprises, the demand for computing offers significant advantages. Forrester emphasized that the use of cloud computing coincide with the cash flow benefits system that is more appropriate than the traditional model. With this system, there will be a move from capital investment to operational expenditure. Cost is seen as a key factor, although it is not the only reason to adopt cloud computing. Cloud omit costs such as technical staff necessary to maintain the data	If for the large enterprises, the adopting of cloud computing lead to real savings, this can be adopted for the colleges and universities in Romania. Cost is seen as a key factor, too for the school environment where different financial resources are needed.

	center operation, additional staff needed to manage public server procurement, capital expenditure for cooling and power, internal technical people that do evaluations and hardware offers, people negotiating the purchase of hardware, internal and external costs for data center designers, management facilities, contracts to take into account the records of all licenses (Group, 2009)	
4. Scalability	Scalability is the ability to expand and contract depending on the needs of the organization of cloud systems. This is the difference between cloud computing and other forms of hosting. In terms of software, cloud computing can enable IT operations of development, implementation and running of applications that can easily increase the capacity to work quickly and without concern about the nature and location of basic infrastructure.	The cloud computing can be scalable and available on request. Thus, the academic institutions pay only for the service used, while it is known that extra resources available can be offered for a possible request.
5. Cloud and software applications	Software applications written in cloud are adapted so that it can work on distributed structure. These applications can be designed to scale, so that additional servers or additional capacity can be added without changing the code (Coombe, Cloud computing - Overview, Advantages, and Challenges for enterprise deployment, 2009)	Educational institutions frequently work with software applications, especially for promoting specialization and for the presentations of teachers and their specializations. So, the solution offered by cloud systems cover this necessity of the educational process, too.
6. Business agility	Most cloud providers use infrastructure software that can be added, moved or changed easily by staff intervention, namely the cloud provider. This dynamic and flexible nature of cloud systems is a real advantage. Many IT departments must work through the procurement processes just to add additional capacity. And it may require time: some weeks. Cloud computing allows organizations to react quickly to market conditions, as necessary. New applications can be rapidly launched with lower expenses.	For the Romanian education agilitata business idea may be too much to say. It is enough to make a record of budget saving idea, as we have shown in the 3rd advantage and specify the dynamic and flexible nature of the cloud systems. The flexibility offered by cloud computing allows new ideas to be tried and tested quickly without departing the daily routine of the existing IT staff.
7. Device and independent location	It is the best device that enables portability and great opportunities for networking and collaboration. The user can access the system regardless of their location and of the IT equipment used (smartphones, netbooks, etc).	The easiness of use of educational and informative resources managed in the cloud systems are an opportunity for teachers who use technology.

In the right hand column we analyzed, after the annexation of the classical advantages offered by cloud computing, the role of each advantage in the educational process. We checked the input of each asset in the development and the good functioning of the process itself. Figure 1, proposed by us describes the interdependence which occured in the learning process, information/ communication/ interaction and the cloud systems once they have been installed, the components being constantly interdependent and ensuring resumption when appropriate.

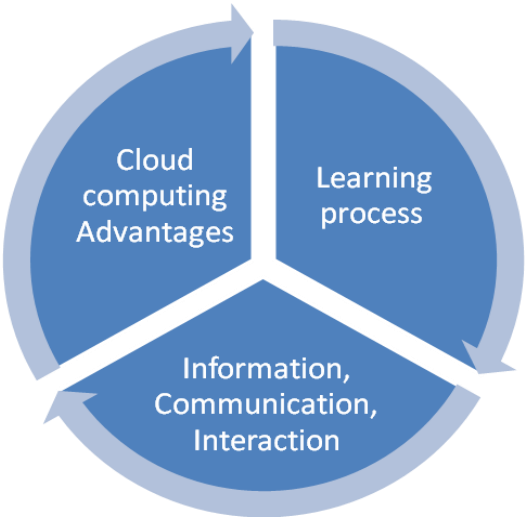

Figure 1. *The interdependence between the advantages of cloud computing systems and the educational process*

In conclusion, after the review and updating of the described factors of pro cloud computing systems, we believe that their use is a natural progression, a technological breakthrough based on the latest generation of IT architecture that better exploits scale technologies.

Conclusion

The Internet addiction to cloud systems leads to the need of organizations to accept this technological change. The advantages offered by cloud computing to the Romanian education lead to performance in the learning process. In order to update the technology, we claim that implementing cloud systems in the learning process, by offering their

services both to teachers and students, is a real advantage. Higher education institutions and not only, should consider and put into balance through its filter the efficiency of these systems. Eventually, their choices in terms of opportunities, approaches and more efficient exploitation of resources will contribute to maximizing the educational outcomes.

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