Cloud Computing For Improving E-Learning

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Abstract— In many countries, E-learning has become a key of bringing knowledge and the quality of education has increasingly becomes in great demand. Deploy E-learning content in a computer network is not always easy, whether is done via the intranet or internet. The distribution of training modules on an e-learning platform requires constraints where the idea of using cloud computing. Our proposal is to define an educational cloud model in order to increase the quality of education and to support the transformation of schools in providing solutions and services that are both innovative, accessible and suited to the current and the upcoming uses. At the end of this research paper we will present the contributions offered by our model in favor of e-Learning actors and cloud computing.

Keywords-component: Quality of education; E-learning; Cloud Computing; Model.

I. INTRODUCTION

E-Learning is a learning mode that takes advantage of the use of technology and communication at all levels of training activity. It specifically refers to a training which its main objectives can be defined as independent learning, distance learning, individualized training courses, and the development of online pedagogical interactions.

Despite its advantages, the set of E-learning accessibility are however limited by the problem of leaving, a phenomenon that has its own touch, based on a reflexive analysis. Among the problems of the E-learning and the constraints that lead to the abandonment of online learning are: investment in computer hardware and software; namely the obligation to use computers, problems of technical order, availability, quality of service.

To achieve its goals and improve the quality of learning we propose the educational cloud model that enables educational institutions which do not have the technical expertise to support their own infrastructure to get access to computing demand.

Cloud computing makes it possible for almost everyone to deploy tools that can scale on demand to serve many users as desired. Service providers enjoy greatly simplified software installation, maintenance and centralized control over versioning; consumers can access the service anytime, anywhere, share data and collaborate more easily, and keep their data stored safely in the infrastructure. [1]

Our model will be useful for reducing the dropout of E-learning systems factors by offering the educational cloud model that combines the different tasks of the actors in the institutions and within the cloud computing.

This paper is organized as the follows; Section II describes E-learning, its benefits and its disadvantages, and analyzes the factors affecting the rate of abandonment of e-learning platforms. Section III demonstrates cloud based e-learning, defines cloud and what benefits cloud computing can provide to an e-learning system. Section IV explains the model of different activities performed by actors of educational cloud and its challenges. Section V ends this paper with conclusion and future work.

II. E-LEARNING

E-learning is widely used today on different educational levels: continuous education, company trainings, academic courses, etc. There are various e-learning solutions from open source to commercial. There are at least two entities involved in an e-learning system: the students and the trainers. [2]

We will assign to the student, through this platform a number of course modules, exercises, assessments taking into account a scheduled planning.

The tutor is responsible for managing learners to be followed. So it will affect their resources of consulting, study courses, assessments to realize the proper assimilation of the content offered.

A. Benefits of E-Learning

E-Learning is considerable interest; its benefits are numerous as it is for business decision makers or the administrative corps of institutions, teachers and learners, among its benefits:

- **Flexibility**: The training is open to everyone, regardless of his age, educational level, or socio-occupational category,..., it offers an opportunity to relax organizations, at least on the side of the learner that not constrained by a unit of time, place and heavy action [3]
- **Accessibility**: Distance learning allows you to learn by providing learning-teaching situations that reflect the individual requirements of each learner,
and that can make knowledge accessible to learners who may have limited access to training, whether for reasons of space, time, technology, or psychosocial and socio-economic. [4]

- **The individualization**: Traditional training offers are often heavy mass. It becomes difficult to put up such devices to individual needs. The observed trend in many countries is to develop compliance provided for each student taking into account individual characteristics and the learning pace of each [5]. A trainer may apply to a large number of learners while providing an individualized relationship with each of them.

- **The differentiation**: Faced with heterogeneous students, it is essential to change, diversify, and consult the learning methods. Since the barriers are not the same for all learners, they can be overcome by supplying everyone with variety of tools. [5]

- **The economy**: No movement which promotes saving time, saving money and optimal training conditions without forgetting that this advantage is very beneficial for people with disabilities.

### B. Limits of E-learning

Despite its advantages, the set of e-learning accessibility are however limited by the issue of the drop out, a phenomenon that touches a special way, in a reflexive analysis, among the limits of e-learning and the constraints leading to the abandonment of online learning:

- **Isolation**: The learner is an actor of his training: he studied alone, without the support of teachers who can make a written and oral demonstration at the same time. For this reason, the conditions must be favorable to motivate [6].

- **Investment in hardware and software** can be the result of unequipped organization in giving e-learning.

- **The obligation to know how to use computer tools**, the element without which we cannot speak of e-Learning, where the obligation of how to use. This is a real problem for those who do not know where the obligation of how to use.

- **Technical problems**: Distance learning is organized by computer skills and the technical problems of order associated with its use and its maintenance cause many inconveniences. This is mainly connection problems (slow or no connection, disruption of the line) which would not be helpful to such large downloads, follow an online video or for sound or follow a video conference. So much for a good follow of course online, availability and quality of network service shall be provided for connection problems disrupt exchange between the protagonists not only during lessons but also during evaluations. This is all the more regrettable in the synchronous sessions on the platform to the extent that they can be interrupted by the lack of connection or a faulty connection.

These stresses can lead to the abandonment of distance education, Louise Sauvè [7] includes abandonment factors into six categories (Personal factors, interpersonal factors, family factors, institutional factors, environmental factors, and learning factors), and Renoult [8] was able to identify 53% of cases of abandonment: 17% are related to lack of motivation, 11% of the time conflicts with work, 9% to shift, and finally to various causes such as (family, distance ...)

We can focus on learning factors as an important one that leads to abandonment in the e-learning context, since the content must be interactive and interesting to motivate learners And according to the constraints already mentioned, we used a new factor to influence learning, the technical factor related to the infrastructure used (Slow download, ergonomics, lack of updates ...)

Figure 1 illustrates the changes.

![Factors of E-learning abandonment](image)

To reduce the dropout rate of learning online, reply new students and emerging technologies. We propose in the section4 the educational cloud model that enhances collaboration and flexibility while reducing the costs of educational institutions and ensuring access to learning and resources everywhere, any time for students and teachers.

### III. CLOUD COMPUTING

#### A. Definition

Cloud computing is a new emerging technology that is expected to significantly change the field of IT in the next few years. Cloud computing [9] is the use of computing resources (hardware and software) that are delivered as a service over a network (typically the Internet). It entrusts remote services with a user's data, software and computation.

Numerous services and applications can be provided in the Cloud due to its many interesting and promising characteristics. Cloud computing [10] is a computing model based on networks, especially on internet, which task is to ensure that users can simply use the computing resources on demand and pay money according to their usage by a metering pattern similar to water and electricity consumption.
B. Issues of using cloud for e-learning

Some of the clear benefits that the cloud computing fetches to overcome the constraints of e-learning systems that we have mentioned previously is given below [11]:

- **Pooling:** Pooling aims to align resources (equipment, expertise, best practices, applications, educational content and infrastructure) facilitate the support, to avoid incompatibility issues or difficult integration between different tools and systems to ensure that each institution no develops and not unnecessarily acquire existing resources elsewhere, Pooling (pooling and exchange) educational quality content promises to erase pedagogical inequality, fight against the phenomenon of "poor" schools.

- **Discount:** The Cloud can better cope with the evolution of increasingly rapid information technology, it also offers the possibility to update centralized and systematic manner of all documents (work, homework, collaborative exercises, projects ...) and fit coherently into a single central point. This helps to ensure their adequacy and relevance, as well as information which are identical for all users.

- **Elasticity:** One of the characteristics of IT and learning resources "in the cloud" is the flexible adaptation of resources and means available (servers, storage space, computing power, application instances, content), with the elasticity of infrastructure and ease to seek resources needed.

- **Flexibility:** Flexibility in terms of park to install in schools: the cloud architecture can potentially support any type of client device and application.

- **Economies:** A reduction in the size and complexity of machinery and software to be installed at each institution and avoid costly local infrastructure, not exploited to their full potential, and consequently the burden of licensing and Maintenance [12].

IV. OUR CONTRIBUTION IN THE FIELD

The device for distance learning system is a complex and complicated in its structure, its players and its operation. It involves management, preparation and a particular organization, to understand the complexity of this system [13] Just look at all the components and the context within which fits distance learning cf.figure2.

Using cloud computing for e-learning solutions simplifies the complexity of the device and influences the way the e-learning software projects are managed.

There are specific tasks for different types of actors and to better understand the contribution of cloud computing, it seems essential to us to describe the system of distance education in all its complexity (learners, tutors, training, educational resources, trading tools, platforms ...) and combined with the cloud that give us a model cf.figure3 Educational cloud.
To make such a description, we distinguished between the tasks that will be performed in the cloud and in the institution.

A. Activities in educational institutes

We have seen that learning factors (motivation in learning context, learning styles, learning strategies, ... ) are important and increase the dropout rate of e-learning courses but with the distinction of tasks between the educational aspect and the technical aspect, the dropout rate will be reduced implicitly since teachers in the school will be dedicated exclusively to sharing their knowledge with students and so they will save time to innovate and improve their work and monitor learners.

Within the institution, there are four key players:

- **Teacher pedagogical designer:** He is responsible for designing training modules and teaching screenwriting content (courses, exercise, evaluation ...), it is responsible in particular for the methods and strategies appropriate learning.

- **Teacher multimedia designer:** In the device of distance education, teacher multimedia designer is responsible for designing and developing educational resources that mediate knowledge (texts, images, videos, animations, sounds ...) for the courses prepared by the teaching staff.

- **Tutor:** The tutor can support students in their learning, it is "generally responsible for taking action to facilitate the learning process and provide educational support. It has a role of guide, resource person. It must both facilitate the transfer of knowledge and help learners in their personal learning process and assimilate knowledge" [14]

- **Training Manager:** He plays the role of coordinator between the various stakeholders of the institution and the cloud; it is responsible for identifying needs and determines the objectives of the device project.

B. Activities in cloud computing

The administration and management of the e-learning platform is entrusted to cloud computing with automatic update, widely available on the network and computing capabilities pooled, but mastered guarantees allowing reduce the support at the expense of institutions.

Computer engineers cloud undertake the implementation and maintenance of the system, they monitor access to the server (speed, bandwidth ...) and the operation of the database, they provide security and recovery data and applications in case of failure and a lot of other spots. To the end user, the cloud is invisible; the technology that supports the applications doesn’t matter, just pay the subscription and depending on the desired requirements (infrastructure, platform or service). Unlike the conventional computer installation services, charges are multiple: purchasing software, servers, IT staff...

V. Conclusion

The educational cloud model is used to improve the comfort of teachers using Information and communication technologies in education, and reducing the cost of these practices both in terms of time and money.

Improving the online training is a key challenge that governments and policy makers in the field of education must face in the world.

Our result has several perspectives; firstly, it is necessary to find partnerships with universities to evaluate our model and improve it, so that it takes other aspects related to e-learning systems including aspects economic, and pedagogical techniques to facilitate the task of identifying, recycling, sharing, and the adaptation of teaching and learning resources.

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