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Creation of a Unified Educational Space Within a SLA University Classroom Using Cloud Storage and on-line Applications

Kamilya Zhumartovna Karabayeva

Kazakh University of International Relations and World Languages, KAZAKHSTAN

ABSTRACT

In the present article the author gives evidence of effective application of cloud storage and on-line applications in the educational process of the higher education institution, as well as considers the problems and prospects of using cloud technologies in the educational process, when creating a unified educational space in the foreign language lessons at the linguistic university. Today there is a growing importance of cloud technology, which offers universities new opportunities to provide modern network technology-based applications, providing a high level of educational service. The pilot testing confirmed the didactic benefits of the cloud technologies: an intensive upgrading of learning content, the development of individual creative initiative, and self-organizational practice in the new educational environment. The novelty of this work is that the author suggests the use of cloud technologies in teaching foreign language (FL) at the higher educational institution in terms of using cloud platforms such as Google Apps Education Edition and Microsoft Live@edu, as well as Microsoft's cloud storage SkyDrive and AppleiCloud. The author suggests prospective lines for implementation of noted resources into the cloud technology-based educational process in both in-class learning and student self-study.

KEYWORDS

cloud technologies, cloud computing, web-service, data processing center, cloud storage, cloud platform Microsoft Live@edu, Google Apps Education Edition, Microsoft's cloud storage SkyDrive and Apple iCloud, private clouds, common clouds.

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Introduction

Problem statement. Integration of information and communication technologies in the course of teaching FL is characterized not only by improving the efficiency of the education process, but also the development of professional qualities of the FL teacher, leads to the creation of new ways of pedagogical

CORRESPONDENCE Kamilya Zhumartovna Karabayev ✉ kamilya0705@mail.ru

activity, and is useful for contemporary educational process. However, to overcome the difficulties associated with the implementation of cloud technologies, higher education institutions should encourage and support the enthusiasm of teachers, eager to implement new information technologies that increase the level of higher education [1].

The implementation of any innovative technologies into the educational process at linguistic university during the practical studies on FL among senior students, i.e. future FL teachers, requires the solution of several issues related to the acquisition, adjustment and maintenance of hardware and software, staff training, software upgrading, purchasing software licenses, etc. Currently, IT professionals are actively using the terms cloud technology and cloud computing.

According to the official definition of the National Institute of Standards and Technology (NIST), which is used by Wikipedia, "Cloud computing is a model for enabling convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction" [2].

Thus, the cloud can be understood as a set of interconnected servers that are remotely carried out all the work necessary to the user to save, update, archive, and process the information. According to the Gartner Group analysts, the migration of the greater part of information technologies into the clouds will take place within the next 5-7 years [3].

In the US universities, there are virtual computing labs (VCL), which are created in the clouds to serve the learning and research processes.

South Korea has launched program allowing replacing high school paper textbooks by e-books, which are stored in the cloud and are accessible from any device that can be connected to the Internet. Chinese, Qatari and Turkish higher education institutions are involved in the IBM Cloud Academy program, which allows gaining access to a rich array of educational resources. Indian universities use cloud technologies for the development of innovative education methods. Despite the fact that Vietnam is not particularly well-known in the IT sector, Vietnamese universities utilize cloud technologies when developing education programs. Thus the State University of Hanoi uses a cloud platform built with involvement of IBM, which has signed with the Hanoi University an appropriate memorandum of cooperation [4].

In Russia, the "University cluster" program runs at the Russian Academy of Sciences since 2008. The program involves 70 universities and research institutes [5] which as it is assumed, will use cloud technologies and create web-based laboratories (hubs) in specific subject areas to provide fundamentally new opportunities for transferring various information materials: lectures, seminars, laboratory-based works, etc.

There is a certain experience of Russian higher educational institutions on the use of these technologies. In particular, part of the infrastructure at the Russian State University for the Humanities is transferred to the cloud, whereas the curricula include additional courses for training in application of cloud technologies.

The emergence of cloud technology (cloud computing) and its employment has the following advantages:

1) the minimum requirement from the resource provider;

2) usage charge or free access (e.g., public clouds services);

3) compatibility with any operating systems and almost any hardware (though not for all cloud services);

4) no need to install and configure software on user computers;

5) no need to change infrastructure due to the use of this technology;

6) no need for operating personnel on the part of cloud computing user;

7) no problems with the purchase of software licenses and additional fees for upgrading software;

8) scalability.

Listed benefits for transfer of educational programs to the clouds open new opportunities for the development of information and communication technologies in education.

However, the vast majority of educational institutions in Kazakhstan are just starting to implement cloud technologies in the educational process and incorporate the appropriate disciplines for their study.

Research and publications analysis. The emergence of cloud technologies has attracted attention of many researchers in the context of their implementation in the educational process. For example, Jian described the possibility of using cloud computing in distance learning [6]; Juan and Yi-xiang have considered the idea of creating a learning community on the basis of cloud computing [7].

Recently there has been a growth in research concerned with the use of cloud technologies in education among Kazakhstan authors. Thus, G. I. Khasenova and K.O. Chakerkhan analyzed the efficacy of using the cloud Azure Services Platform, Google Apps Engine, and Amazon Web Services in foreign countries, such as the USA, Japan, South Korea, Russia, as well as successes in implementing these technologies in Kazakhstan [8]; Z.S. Seydametova and S.N. Seitvelieva reviewed Google Apps online cloud-based computing services for education institutions [9], etc.

Problem analysis. Recently there has been a growing interest on the opportunities providing worldwide implementation of cloud technologies in education. Microsoft CEO Steve Ballmer noted that "cloud computing, to a greater degree than anything else that I've seen over the last 10 years, really are the next generation of opportunities for people, who develop software throughout the world" [10].

Thus, cloud technology-based services are just starting to develop actively and integrate in education. Therefore, the issues on the development of educational cloud services and methods of their use in the educational process, including FL lessons at the linguistic university, remain urgent and unresolved.

Goal setting. The purpose of this article is to study the issues and prospects of using cloud technologies (Microsoft Live@edu, Google Apps Education Edition and relevant cloud services) in the learning process.

The main part. Consider examples of cloud technologies application in the educational process. The most internationally known are free cloud-based platforms: Microsoft Live@edu, Google Apps Education Edition and cloud services on their basis.

1) Cloud services to gain skills of working with documents and web services.

1.1) Cloud platform Microsoft Live@edu (http://www.liveatedu.com) [11] provides opportunities for practical learning of known office applications through a web browser based on cloud technology.

Figure 1. Integration of cloud platform Microsoft Live @ edu with various services and Microsoft software

The Microsoft Live@edu cloud services include the possibility of using e-mail, calendar, carrying out video conferencing, availability of virtual whiteboard and desktop sharing; establishing and maintaining user website; creating and editing documents of any complexity in Word, PowerPoint, Excel and OneNote editors. The possibility of using free cloud storage service SkyDrive that lets storing, synchronizing and accessing files across PCs and devices is another advantage of open access to office applications (http://www.skydrive.live.com).

1.2) The Google Apps Education Edition cloud platform [12].

Here are some basic tools that students and teachers can use through Google Apps Education: Gmail with support for text, voice and Google Talk video chat; Google calendar, which can be used for planning all types of events including tours at the beginning of the joint project or classes; Google drive is a storage media (the default size is 5GB) to store files and configure access rights; Google Docs – is a tool for creating documents, spreadsheets and presentations of any complexity with the possible use of templates; Google sites – is a tool for creating websites using templates; Vault – is an additional Google Apps tool, which allows managing the information, i.e. organizing a quick search of the necessary information, archiving and exporting in standard formats via e-mail or chat; organizing the protection of information against

accidental or intentional deleting; creating reports with data about user activity and history of working with data.

Google Apps Education is constantly expanding its services for educational institutions. In particular, the additional services are Apps Marketplace (acquisition, implementation and integration of web applications compatible with Google apps), Google Moderator (service for the ordering of issues under discussion), Google Apps script (this JavaScript cloud scripting is used to automate tasks), etc.

2) Cloud services to develop in-house tests or use existing ones. For example, OpenTest is an Internet-based cloud service allowing quick development of own tests, which provides free service of up to 100 students per month in the Lite mode with just one test manager (http://www.opentest.ru/).

Another opportunity to develop own online learning applications is the Microsoft Windows Azure cloud platform (http://www.windowsazure.com/) [13].

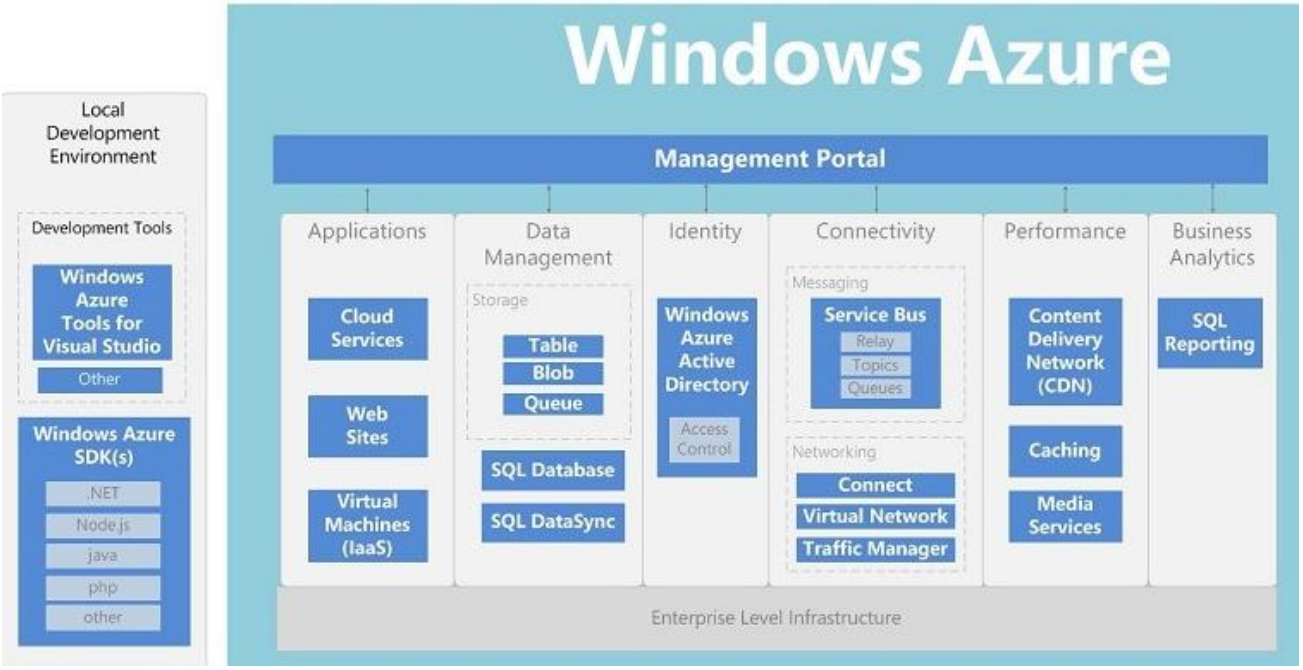

Figure 2. The structure and options of Windows Azure

The most important component of the Windows Azure cloud platform for the development of training applications is a local development environment of the platform itself with the ability to use Visual Studio and Java programming languages as well as the technology for creating ASP.NET web applications.

3) Cloud services and storages. The most well-known cloud storages are SkyDrive, Apple iCloud, Google Drive, Dropbox, and others. Consider cloud storage Apple iCloud with its features for using Apple and SkyDrive devices as well as its capabilities of working with documents.

3.1) Apple iCloud storage can be used by students as a 5 GB storage for all kinds of files that are transmitted from Apple devices to remote Apple servers.

The iCloud service allows using the calendar for scheduling events and reminders, edit documents with automated backup feature, use email, etc.

3.2) SkyDrive Cloud storage. When using SkyDrive cloud storage, each user gets 7 GB to save own files with the ability to create directories and set excess permission. The advantage of SkyDrive cloud storage is integration with office applications Microsoft Office Web Apps, allowing users of SkyDrive cloud storage to use Word, Excel, PowerPoint, OneNote office applications in a browser window.

The main advantage of using cloud platforms and cloud services is the continuity and availability of training in any place and at any time. The interaction of teachers, students or administrators with a cloud-based platform and its services is carried out using any device (PC, pad, mobile phone, etc.), which has the installed browser allowing connection to the Internet [14].

Thus, any student can begin to perform the job in the classroom and continue working at home without having to copy part of the completed assignment on any media due to the fact that all the necessary information is stored in the cloud (data processing center) on a remote server.

When working in the cloud, students must actively communicate with each other at all stages. Active interaction between students and teachers is of particular importance for the implementation of project methodologies. The interaction of cloud services with social networks is possible as well. The most famous example of the integration of cloud computing with social networks is the possibility for Facebook social network users to create cloud applications based on the Amazon Web Services [15].

Figure 3. The functions of Amazon Web Services

Practical implementation. In the process of implementing cloud technologies in educational process on the basis of Google Apps Education Edition platform, the model of the university "private cloud" architecture was

designed. Structurally, private cloud is an educational "space" of a certain university. The key elements of this model are:

1. Hardware and software infrastructure of the cloud is organized based on data processing centers (DPC). Failover software and hardware core of the DPC (organized at the university level) consists of technical support of the DPC, cluster system software, virtualization systems and means to ensure the network functioning. Technical (hardware) software consists of a computational cluster and a complex of network storage systems.

2. The web server-based cloud management interface, which enables carrying out cloud resources management and access to cloud services based on http-protocol, using web technologies.

3. Cloud resources virtualization and management media, which is a special "intermediate" software that allows implementing basic cloud properties (such as providing resources as services, automating control, and organizing user self-service), as well as managing accounts, resources and user rights.

4. Means to access cloud services, which are a set of protocols and technologies, enabling users to connect and take advantage of the needed services.

The proposed scheme reflects the main elements of the cloud architecture. Based on the analysis of this architecture we can draw the following conclusions:

- first, the totality of the cloud software system can be considered as a cloud type OS, whose distinctive feature consists in the mandatory presence of the virtualization and dynamic reconfiguration module of cloud resources;

- secondly, the cloud architecture provides two user modes: resource management and the use of services.

- thirdly, the use of web server for the organization of a universal user interface, on the one hand, simplifies access to cloud services, while on the other hand, tends to restrict the possibilities of http protocol-based cloud services; therefore, it is possible to predict the development of a special extension of http-protocol or an entirely new protocol for remote control of the clouds.

During the testing of given private cloud model, each trainee participating in the project (87 people) was given a personal learning environment (in form of personal online account), which was organized through the cloud services.

Let demonstrate the continuity of interaction between teachers and students in the cloud and list the main stages (blocks) of such interaction:

1) designing plans and communicating to the students about the basic activities and topics to be discussed via a cloud service (Google Apps Education Edition calendar);

2) discussing problem issues in the chats (text, voice and video chats) and exchanging messages via e-mail (Google Talk voice chat);

3) creating, distributing, editing, and discussing the documents created by students and teacher (Google Docs);

4) creating students' presentations based on the results of previous studies and their dissemination for discussion, evaluation by teacher and other students (presentation in Google Docs);

5) designing a website with content based on the documents, spreadsheets and presentations created at the stages 3 and 4 (website in Google Apps)

6) carrying out teacher's control over students' activity and participating in chats; carrying out operational management on preservation of information; and reporting on the students' participation (Google Apps vault).

An important block in interaction between students and teacher is the operational management block, which can be used by the teacher to influence all stages, correct the actions and activities of the students, and direct them to achieve certain results.

Problems and prospects of using cloud technologies in education. A promising direction in the educational process of universities is the possibility of collaboration between the private cloud and common educational cloud [16]. The private cloud and the common educational cloud provide simultaneous access to remote processors, software, and data storage (resources), and infrastructure, though the private cloud is a "space" of a certain university, whereas common learning cloud brings together universities with their resources into a single "space" that expands opportunities for both the students and teachers, though leads to certain problems.

Important issues when implementing cloud technologies in education institutions arise with regard to privacy, access control, security and secure storage of information (for example, the functionality of the powerful services of Google and Microsoft may be destroyed by DoS attacks), possibility to access personal cloud in any circumstances, respect for intellectual property rights, and free access conditions [17].

Let list the promising development pathways of cloud services.

1) A promising development pathway of cloud technology is the development of online training applications. An important component of cloud platform is a local development framework. For example, the Windows Azure local development framework provides the possibility of developing training applications or personal tests.

2) The availability of local development framework of cloud platforms helps to create personal development frameworks in the web programming languages and, as a consequence, creates a perspective for studying programming languages in the cloud-based environments.

3) Transfer of the Moodle and Blackboard systems into the cloud is another promising avenue in the development of cloud services.

Conclusions. Thus, it can be argued that the implementation of cloud technologies into the educational process is aimed at improving the quality of teaching FL at the linguistic higher education institution.

The implementation of cloud technologies is a new trend in the field of computer technology. It still continuous developing, though we can already specify the special advantages of their use in education, their perspectives and

didactic potential, which consists in the fact that, firstly, cloud services give researchers and scientists the ability to instantly process vast amounts of information with low cost of computing resources, instantaneous dissemination of information and sharing analysis findings with other researchers around the world. Secondly, cloud technologies create an opportunity for continuous learning based on mobile technologies and social networking services support and make the learning process interactive, that is, a student can obtain learning materials at any time and at any place, where the Internet is available. At the same time cloud technologies allow teachers to conduct interactive online student advising and instantly get answers to their questions. They allow data storage in the cloud (data processing centers) without having them transmitted from one device to another (e.g., from university computer to home computer), that is, the user is not tied to specific hardware. And finally, cloud technologies provide the teachers of educational institutions an opportunity to conduct independent testing using existing cloud services or to develop their own tests.

In connection with the foregoing, we should note also certain limitations of the conducted study, consisting in a limited number of involved students (75 people) and teachers (3 persons). Note that the implementation of cloud technologies into the educational process on the basis of Google Apps Education Edition platform was caused by availability, versatility, simplicity, user friendliness, and free-of-charge use of this product, having also the additional services for education institutions.

The author associates the further research prospects with the disclosure of the value potential of the cloud technology that can be used not only when working with students of linguistic education institution, but with students of other universities as well, including foreign ones, through the organization of common educational cloud on common scientific and methodological basis.

These horizons can be achieved only if the human resources management relating to selection of FL teachers at the linguistic university will be coordinated in such a way that the position occupied by inactive teacher, unwilling to change his traditional approach to teaching, will be given to innovation-minded person having skills (or willing to acquire skills) in innovative computer technologies in order to improve the quality of teaching FL during practical studies at the linguistic university.

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