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Manako A., Voychenko O.
International Research and Training Center for Information Technologies and Systems of the National Academy of Sciences (NAS) of Ukraine and Ministry of Education and Science (MES) of Ukraine

TECHNOLOGICAL SOLUTIONS FOR COLLABORATIVE WORK WITHIN THE LIFELONG LEARNING

Abstract. Recent years demonstrate significant transformations in the field of education. The reply to the challenges of globalization and modern information society is implementation of lifelong learning paradigm (LL). The implementation of LL paradigm suggests a more complex and flexible learning process than the traditional one, with essential role of collaborative work of virtual teams. Maximum efficiency of virtual teams is achieved through the flexible use of the combination of both basic functional components and auxiliary tools based on cloud services. This task can be solved by creating a modern ICT-based environment, which implements an effective information support to collaborative work of the members of virtual teams. The environment provides technological solutions for the virtual teams and communities. It also provides features to implement flexible roles distribution, depending on the specifics of the addressed problem and the level of involvement of a particular user in the learning within the LL paradigm.

***Keywords:** Lifelong Learning, ICT, Cloud services, Virtual teams.*

Introduction

The Recent years demonstrate significant transformations in the field of education. The reply to the challenges of globalization and modern information society is implementation of lifelong learning (LL) paradigm. The idea of LL [1] suggests that formal education obtained through a school or University nowadays is not enough for people to cope with changes in the socio-economic and technological environment. A straightforward approach suggests a mechanism for courses updates and creation of up-to-date learning content available both for current students and for former graduates as re-training. However, a detailed study of this concept demonstrated the need for substantial change in the traditional approach to continuous education as an administrative requirement implemented through short-term courses to transform it into lifelong and life-wide learning [2-4].

Learning and training in the information age are no longer separated from other activities, and are rather interwoven with business processes, persuading individual hobbies, or community activities. Learning requirements nowadays are based on the individual needs, preferences, and objectives; learning groups become diverse in many aspects challenging the effectiveness of lectures and group activities. Different kinds of learning, varying by their pedagogical background and technological implementation are needed to support LL, such as self-directed learning, learning on demand and informal learning [5].

In the era of LL the teaching process is being transformed.

Within the classic paradigm a teacher carries out the course year by year, with minor changes in the course materials. It is assumed that the teachers have necessary knowledge and are able to successfully meet the challenges of teaching, relying mainly on their own.

If implementing the LL paradigm, in addition to an increase of demand for education services, requirements for the level of teaching also increase significantly. Often there is a need for an in-depth review of particular issues of students' interest that may go far beyond the basic course

program. In this case, the meeting of the growing students' needs may require involvement in the educational process the scientists who are experts in a specific field.

In the information society, with a high rate of accumulation of new and obsolescence of existing knowledge arises the need for rapid and significant renovation of learning courses in a wide range of disciplines and the involvement of invited experts becomes a common practice.

As the invited experts often do not work in the same institution and are not located in the same office, they use to collaborate as a virtual team.

Thus, one of the key issues for implementation the LL paradigm is successful collaborative work of the virtual teams, both students and teachers.

Traditional educational process within the classical paradigm limits number of participants' roles by two: a teachers and a student. Transformation of the educational process leads to an increase of the number of roles. It should be taken into account that the invited experts' participation is not always limited just by one or two lectures during the course. Such experts, for example, may work as consultants or students' diploma work co-supervisors.

Modern virtual teams have more than two roles and different levels of individual members involvement in the collaborative work.

Basic tools for collaborative work

Let's consider the ICT-based tools used by virtual teams for their collaborative work.

As the LL "grows out" of e-learning, the natural tools for it are the ones traditionally used for e-learning, such as learning management systems (LMS). Traditional approach to e-learning, based on the classical LMS, has a number of issues that do not allow to use all available potential of modern ICT for LL implementation and support.

If using the LMS one area of concern is the strict regulation policy for students' access to the learning resources. While learning with the LMS students gets access to only those resources that are directly related to their current learning activities.

After graduation in the vast majority of cases student's account is disabled, so student becomes deprived of further use of the learning resources within LMS except ones that are available for guest access.

In e-learning the communication between members of virtual teams is carried out via electronic communication tools within the LMS. So strict access regulation policy may lead to blocking of some virtual teams.

Participation in LMS-based virtual teams with strict access regulation policy is only possible for students taking a course at the moment, and joining to the virtual team the graduates or external experts may be difficult.

Evident response to this new challenge could be a transformation of the traditional educational process, the review of information policies, changes in resources access regulations and making changes in LMS. However, such response may require a significant investment, performing software re-design and engineering work, which necessarily would entail substantial period of time, and as a result, the delay of a rapid response to emerging challenges.

In addition, reformatting the functioning of educational system is fraught with failures in the educational process and may not provide a 100% guaranteed result.

Alternative solutions are based on the use of the functionality of multiple systems, when each of them covers a segment of the general problem [6].

Cloud services use for virtual teams

During the collaborative work members of virtual teams generate and accumulate large volumes of auxiliary and reference materials in the form of text documents, spreadsheets, presentations, etc. These materials are used within the virtual teams and are not intended for direct placement in the public domain. So it becomes an actual problem for the virtual team members to effectively share these materials and to enable their remote processing.

Sharing access to these materials needs a simple and reliable solution [7].

Such solution is to use popular cloud services such as Google Docs, Microsoft Skydrive or Apple iCloud. These services allow to create, store and share documents on-line. The use of cloud

services makes it possible to eliminate most of the problems encountered in active e-mailing, and to ensure that team members have access to current versions of working documents, regardless of what kind of computer or mobile device is used at the moment.

Another basic element of the educational process within the LL paradigm, which allows the rapid review and update knowledge in specific areas, is the participation in scientific and educational events such as conferences, seminars and roundtables. This activity provides students to be aware of current events, keep track of the latest innovations and deeper understanding of the main trends in the development of their areas of interest.

In the scientific and educational activities can engage students, alumni, teachers, external experts, etc. The level of involvement in a particular event can vary from attending as an audience, to active participating in discussions and reporting on topics related to the activities of virtual teams.

Effective distant participation in such activities requires adequate technical solutions to harness the full potential of advanced ICT.

Creating a modern ICT-based environment, which would implement an effective support to both on-site and distant participants, may solve this problem.

When developing an effective support system for scientific and educational activities current trends in ICT development should be taken into account.

Now in the Internet there are specialized resources (hostings), aimed to work with a certain types of media. These resources offer a set of services to upload, download, search and play the corresponding media. For example, video hosting services like Youtube provide the opportunity to quickly publish large volumes of video and make it available to a wide audience.

There are several advantages of using such special hostings, compared with the traditional approach - the placing of multimedia content on the website of institution:

- Accessibility - access to resources independent of technical state of the website of institution. Special hostings are stable and reliable;

- Coverage - special hostings allow large number of simultaneous connections, their communication links have high bandwidth. Chances for overload are much lower compared to the average institution website;

- Adaptability - compared with average institution websites, special hosting less demanding to the user and support wider range of hardware and software configurations of the clients, including the mobile devices.

Environment for on-line events support

The aggregation of a distributed multimedia content may be practically implemented by embedding of various types of multimedia resources hosted on external special hostings in the appropriate pages the website where they may coexist with the resources located directly on this site.

The environment for information support for virtual teams' scientific and educational activities is presented in Figure 1.

Figure 1 shows that the environment performs the aggregation of the basic types of resources used by virtual teams for the scientific and educational activities.

These include:

- Articles and abstracts;
- Slides used to illustrate the reports;
- Audio recordings of speeches, debates and discussions;
- Video recording of key reports and other highlights of the event;
- Audio and video podcasts that enable selective access to the materials of the event using a wide range of devices;
- Twitter-feed and webcasts, allowing remotely monitor the events in real-time;
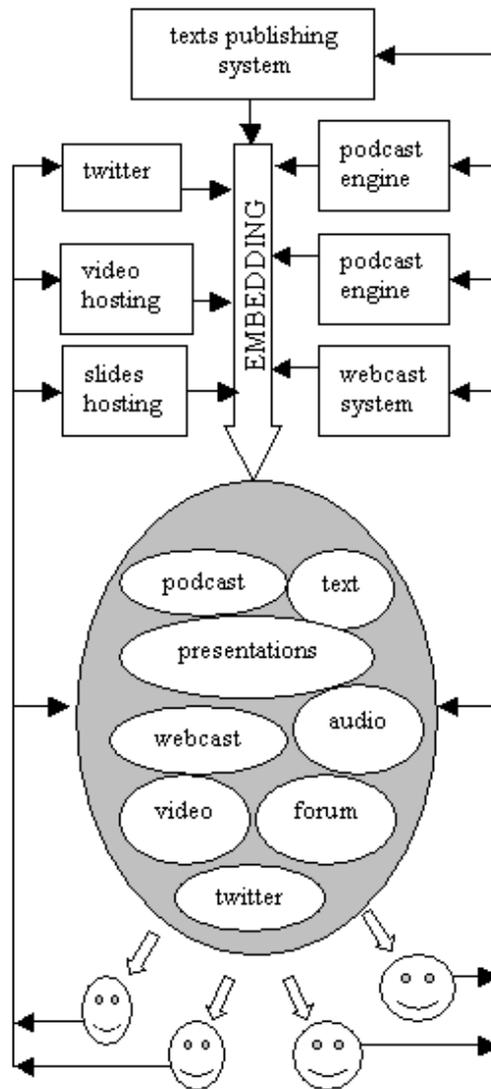- On-line forum to discuss the event.

Figure 1. Environment for information support of virtual teams

Thus, the effective collaborative work of the virtual teams members may be established by use of a flexible combination of both basic tools and auxiliary ones based on cloud services.
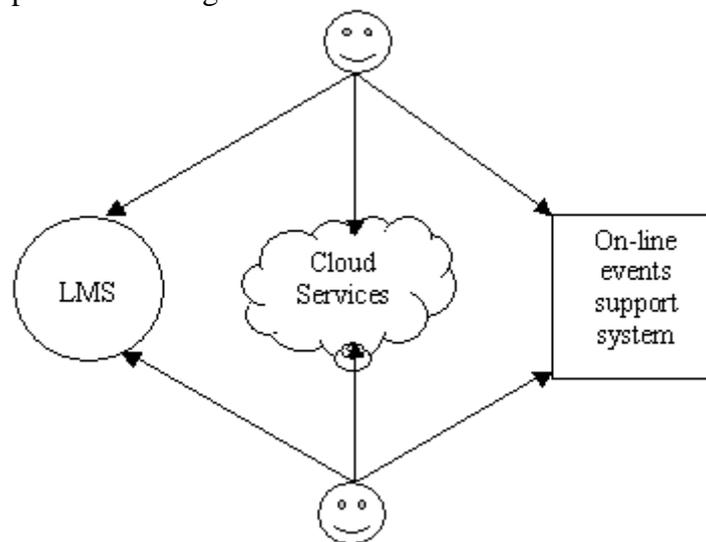
Such solution is presented in Figure 2.

Figure 2. Solution for collaborative work.

Conclusion

The outcome of the described environment is significantly higher than it was when using the components individually. Now it is possible to provide support for LL virtual teams to solve a wide range of educational problems. Available tools allow full use of the powerful modern ICT potential.

The environment provides a wide support for activities of virtual teams within the LL. It allows implementing flexible roles management, depending on the considered educational task and the level of involvement of a particular participant in its consideration.

In general, the proposed solution may be regarded as an essential element of the system of LL..

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Манако А. Ф., Войченко А. П.
Международный научно-учебный центр информационных технологий и систем НАН и МОН Украины

ТЕХНОЛОГИЧЕСКИЕ РЕШЕНИЯ ДЛЯ СОВМЕСТНОЙ РАБОТЫ В РАМКАХ ОБУЧЕНИЯ НА ПРОТЯЖЕНИИ ЖИЗНИ

Последние годы характеризуются существенными трансформациями в образовательной сфере. Ответом на вызовы глобализации и формирования современного информационного общества является переход к парадигме обучения на протяжении жизни (Life Long Learning, LLL). Реализация парадигмы LLL предполагает более сложный и гибкий, по сравнению с традиционным, процесс обучения, существенную роль в котором играет совместная работа виртуальных команд. Максимальная эффективность работы виртуальных команд достигается при условии использования и гибкого комбинирования как базовых функциональных компонентов, так и вспомогательных средств и инструментов на основе облачных сервисов. Данная задача может быть решена путем создания среды на базе современных ИКТ, которая позволила бы реализовать эффективную информационную поддержку совместной работы членов виртуальных команд. Созданная среда предоставляет

широкий спектр технологических решений для организации и функционирования виртуальных команд и сообществ. Механизмы среды дают возможность реализовать гибкое распределение ролей в зависимости от решаемой проблемы и степени вовлеченности конкретного пользователя в процессе работы/обучения в рамках парадигмы LLL.

Ключевые слова: LLL, ИКТ, Облачные сервисы, Виртуальные команды

Манако А. Ф., Войченко О. П.
Міжнародний науково-навчальний центр інформаційних технологій та систем НАН та МОН України
ТЕХНОЛОГІЧНІ РІШЕННЯ ДЛЯ СПІЛЬНОЇ РОБОТИ В РАМКАХ НАВЧАННЯ ПРОТЯГОМ ЖИТТЯ

Останні роки характеризуються істотними трансформаціями в освітній сфері. Відповіддю на виклики глобалізації та формування сучасного інформаційного суспільства є перехід до парадигми навчання протягом життя (Life Long Learning, LLL). Реалізація парадигми LLL передбачає більш складний і гнучкий, в порівнянні з традиційним, процес навчання, істотну роль в якому грає спільна робота віртуальних команд. Максимальна ефективність роботи віртуальних команд досягається за умови використання та гнучкого комбінування як базових функціональних компонентів, так і допоміжних засобів та інструментів на основі хмарних сервісів. Дана задача може бути вирішена шляхом створення середовища на базі сучасних ІКТ, яка дозволила б реалізувати ефективну інформаційну підтримку спільної роботи членів віртуальних команд. Створене середовище надає широкий спектр технологічних рішень для організації та функціонування віртуальних команд і співтовариств. Механізми середовища дають можливість реалізувати гнучкий розподіл ролей залежно від розв'язуваної проблеми і ступеня залученості конкретного користувача в процесі роботи / навчання в рамках парадигми LLL.

Ключові слова: LLL, ІКТ, Хмарні сервіси, Віртуальні команди