

Social-Communication Web Technologies in the Higher Education as Means of Knowledge Transfer

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Abstract — The presented research deals with an expert scientific and pedagogical assessment of the factors of the transition from information and communication technology Web 2.0 to Web 3.0, which is decisive for the author's stated more global task of scientific research, namely, the computerization effect of the knowledge essence in terms of scientific and pedagogical conditions, their distribution, generation and effective assimilation by participants. In this context, the pedagogical trend is clearly followed - the development of "machine pedagogy" as the theory and practice of knowledge acquisition by computers and computer-based network entities. As modern and common *eb technologies, social networking communications, e-learning, virtual learning classes.*

I. INTRODUCTION

The questions of the introduction and effective use of modern *knowledge-oriented* computer-based learning technologies in the educational process of universities and by technological trainings at the industrial fields are actively researched nowadays [1-10]. The amount of available data and knowledge is increasing in geometric progression by the learning as by industry. Today, every person, from a student to a specialist in higher education operates with certain context-sensitive data and knowledge. Such a context is determined by professional interests, primary education, qualifications, experience, major of training etc. It should be noted that this process is thoroughly and instrumentally provided with information and software tools (that is, social networking software), which in modern conditions effectively works inside the framework of Web 2.0 platform (which is a platform for information and computer technology users and participants of social networks) and provides means for the exchange of data both between computers and between people. At the same time, the exchange of knowledge in the human-machine configuration of Web 2.0 is possible today only among people being the only known intellectual entities. The task of the future Web 3.0 platform is to achieve the level of effective knowledge sharing between computer-based entities in the form of local computers, network-oriented computing tools, intelligent agents, etc. The

platforms where one can observe the emergence of new trends, the author highlights wikis, blogs and forums as existing tools for network sharing of knowledge and types of professional competence with the maximum possible involvement of target groups of professional-oriented higher education institution, which is a prerequisite for reforming and development of new standards of higher education in Ukraine.

Key words – *computer-based communications, computer-based training, knowledge-based society, w*

analysis of the classical and up-to-date tools of the Web 2.0 platform allows to highlight the discussion forums, as the most potentially interesting, in terms of *knowledge sharing* between the people involved in some original Web resource, as well as on the level of social software like Facebook, Viber etc. At the same time, the idea of *forums*, in this context, can be expanded to the level of arbitrary network environment of a certain network group of users (both open and closed to external participants) in which the exchange of knowledge takes place. Such an extension is appropriate, since in many cases the discussion forum environment is considered as such that requires control and targeting to achieve a significant pedagogical effect. All accumulated pedagogical experience of computer-based education can be reduced to the same problems being solved by a skilled, experienced teacher: goal-setting and control. In ordinary student audiences, it is often possible to observe a situation where the excess of above mentioned requirements leads to students' ignoring and emergence of conflict situations and at the same time, the lack of such requirements also does not allow to achieve a real pedagogical effect. All these problems determine the general context, goals and objectives of the proposed study.

Thus, the purpose of the work is to enable the use of the widespread social and communicative means in the high educational institutions that can provide an effective exchange of knowledge in the discussion field, when appropriate scientific and pedagogical conditions are created, as well as platforms for

observing the formation of new computer-based pedagogical essence of knowledge-oriented learning technologies.

II. THE OUTLINES OF KNOWLEDGE

Historical development of human civilization can be considered as a continuous movement in the direction of "preindustrial-industrial-post-industrial, informational, post-informational (based on knowledge)" society. The main factor of such development is the progress of technologies in the mass production and information processing. It is important to note that in this progress the share of pure knowledge and processing technologies increases continuously with respect to the total gross product due to the growing importance of preparation and comprehension of the common development means of production and also production and public control in general. It means that the latest production technologies are becoming increasingly dependent on the latest knowledge, including the form of "know-how". And the value of the actual experience of production personnel loses its criticality for the quality of products.

The present state of the postindustrial and post-informational society is often characterized as a knowledge society, where knowledge becomes a determining factor in all spheres of social and industrial life.

The development of the concept of a society of knowledge is based on the idea of problem-oriented learning of knowledge. That is, for specialists it is not just about getting a certain level of education or a degree, but above all about their readiness for continuous education during their professional life. The number of professions that require such an educational gradient is constantly increasing. It should be borne in mind that further vocational education (i.e., professional life with continuous education) is a mandatory requirement to maintain a high level of competence and professional compliance in the modern labor market. In terms of pedagogy of professional skills, such challenges will require certain personal qualifications. The very essence of studying at the university becomes clear when we look at the transition from lectures (so-called "pure teaching") to the newest forms of knowledge exchange in the process of the report made by senior students, especially masters, postgraduate students, doctoral students, invited specialists from industries of production or information activities. The essence of rethinking concerns the unchanging goal of university education – the transfer of knowledge, which has become possible due to technological advancement in the field of information technology. The role of students in this context varies from the basic level of lecturers to the level of active participants in the educational process, and in research universities to the level of partners, where the difference in scientific and educational degrees does not create the appropriate barriers to subordination but helps to find its place in the real scientific research, in which the participation of such person will be as effective as possible in terms of costs and competences.

The use of computers allowed to significantly enhance and diversify the classical teaching methods in terms of time expenditures and the amount of minimum training effort. The hypothesis that in the future the teacher could be completely replaced by technical computer-based means was put forward, such judgments had a marginal character in terms of not only possibilities but also the need to replace the teachers with their computer substitutes.

In the pedagogical theories, the stage of definition and formation of e-learning technology is very important, namely, teaching and learning methods are most effective in the new e-

learning environment. Thus, forming the foundation of the new educational platform for e-learning, the information and software aspects of solving such pedagogical problems as knowledge transfer, knowledge acquisition, knowledge preservation and knowledge control were determined. The last element has become the largest development and application in the field of computer-based e-learning. The main contradiction that emerged in this context is that the level of effective correlation and the rational distribution of learning tasks between electronic and traditional education has not been determined. It is because of e-learning field has received a significant revolutionary development from local large computers to social and communication modern networks, which showed and substantiated virtually limitless possibilities of computer technologies in the further development of the initial set of e-learning characteristics in terms of its properties and competencies. At the same time, the main tasks of the relationship between "teacher-student" at the level of traditional communication did not actually change, - the student continues to master the necessary qualifications through their study, taking over the experience of relevant specialists and experts. Nowadays there is no unambiguously grounded decision which type of training is more effective and optimal – electronic or traditional. It can be argued that today there is a very large number of mixed forms of learning with a diverse number of their types and structures. That means, the following facts are indisputable:

- 1) the computer becomes the determining factor for success in all aspects of the educational process;
- 2) most of the training material becomes computer-based, which is inevitable from the point of view of the physical nature of the speed of data channels;
- 3) unfortunately, there are no reasonably effective ways and means of computer-based knowledge transfer without the participation of a traditional teacher. If this process takes place, then it is definitely a hybrid, human-machine implementation.

Therefore, we realize that in the initial process computer-based means and methods of data transfer become the basis for providing educational process data, providing training material in the form of data. Since the main task of each learning process is to acquire knowledge, it can be argued that such a process is impossible without the participation of a person as a carrier of active knowledge.

From a pedagogical point of view, an important factor is that the effective use of computers in teaching created a huge need for the study of computer science, computer technology and IT in general. That is, the computer became both the means and the purpose of learning. In the mid 90's of the twentieth century the rapid development of the Internet, which changed all spheres of human life, has accelerated the further development of such fields of training as "computer-based training" which is carried out through a PC. Development of the latest ICT (information and communication technologies) in the period 1995-2018 can be characterized as super-fast, cross-platform, comprehensive, mobile-innovative. This became the prerequisite for a new phenomenon in computer-based learning known as web-based training (Fig. 1).

From Fig. 1, we see that computer-based training (CBT) is a method that can be implemented with or without connecting to the Internet in order to convey the complex content of the material visually and regardless of time and place. An additional advantage of this technology is the possibility of physical control of copyright in educational content, which is especially relevant in the study of programming, foreign languages, etc. The

obvious problem with the application of this educational technology is that when working with it student has neither contact with other students nor with the teacher. Therefore, the application of this technology must pursue goals that can be fully realized with independent means.

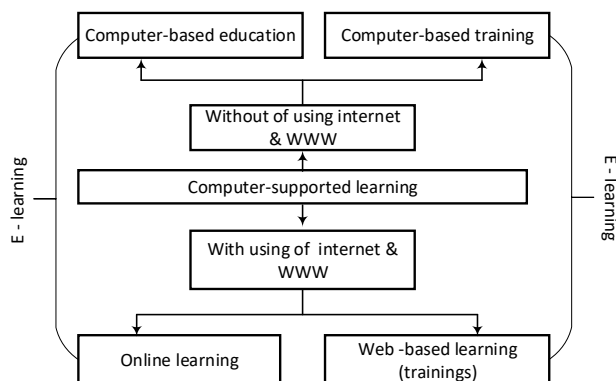


Fig. 1. Computer-supported learning

In addition, since the mid-1990s the twentieth century has begun a new form of learning – on-line learning (on-line distance learning). Existing modern tools such as forums, wikis and blogs should be considered as the fact of how initial ideas of on-line learning are effectively implemented.

Web-based training (WBT) includes all methods that can be applied through the Internet, Intranet and Extranet in order to form the learning process and create an environment that can be used by both students and teachers.

An important stage in the development of computer-based technologies in education should be considered the further development of the concept of the information society, the active formation of which was observed in the 90 years of the last century, and was conditioned by the development of computer-based media, the development of information technology and the full-fledged expansion of Internet, WWW and the Web.

While CBT technology does not require an active high-speed connection to the Internet, the use of WBT technology puts the necessary condition for the use of such connections, as well as the requirement for a server of appropriate power, since the IT nature of this technology is expressed by the client-server. The use of multimedia educational content is also imposed in the case of additional restrictions on the speed and stability of communications. Unfortunately, a very small number of computer classes usually meet the requirements of modern WBT in a typical university in Ukraine. Therefore, adaptation of WBT solutions in real-world conditions is best done with mobile-oriented targeting and Wi-Fi technology, where students use their own little gadgets (like smartphones, tablets, etc.). All this should provide a simple and quick update to the content of *communication* in general, as well as the opportunities for the joint interaction of teachers and students.

On-line learning, in turn, encompasses all forms of learning that can be applied to the Internet as an educational technology. A tele-education technology, distance learning, distance learning courses i.e., virtual classroom technology, are similar technologies that are used in real classrooms. Thus, the learning process using the above listed new forms of learning is media-based and media-dependent in the Internet environment or localized computer networks of the Intranet type. Such an educational process can be defined as an e-learning type, which is similar in nature to the concept of virtual learning and on-line learning. The defining feature of such applications is the use of

information and communication technologies, in which the functions of ICT create a convenient learning environment that allows, for example, the use of hypermedia, multimedia applications and means of testing the knowledge, skills and abilities of students, the formation of which is the main objective of the technology of this class. Thus, it can be assumed that computer-based and web-based training technologies together form the technology of computer-supported learning, which is the basis for the development and formation of e-learning technology. It is worth mentioning that online learning is often understood as e-learning. Although, these terms may not entirely coincide in many contexts. In particular, the genesis of the term e-learning should be interpreted as electronically supported learning, i.e. learning using information and communication technologies and using an actual form of publicity of the content. Such an approach may include, in addition to, the Intranet and Ethernet, the means of satellite communications, analogue and digital video, interactive television technology. If in the early stages of the development of teaching technology, students could receive lectures in audio and video, as well as in the form of projection slides, today, such information is stored not in analogue, but in digital form on the server of the university to which the student has access by the local network of university, through the WWW and the Internet, through the mobile Internet using a smartphone. Thus, the types and forms of e-learning offerings are growing steadily in terms of the speed and quality of the use of network connections and the Internet as an environment and means of learning. The future perspective is that the WWW will absorb currently known sources of information, including it in the form of data and knowledge. And WWW environment will become a unified and fully functional learning environment in which a subspecies of e-learning will be provided in any type of training.

The concept of computer-based communication (Figure 2) denotes all forms of communication between people that is carried out through the means of a specific or multiple computer systems. This kind of communication has a connection with on-line training, which is possible due to online connection. Computer-based interaction without the Internet involves an additional means of communication, such as a phone. The concept of network software for user groups is a component of computer-based communications with computer-based collaborative work (fig. 2).

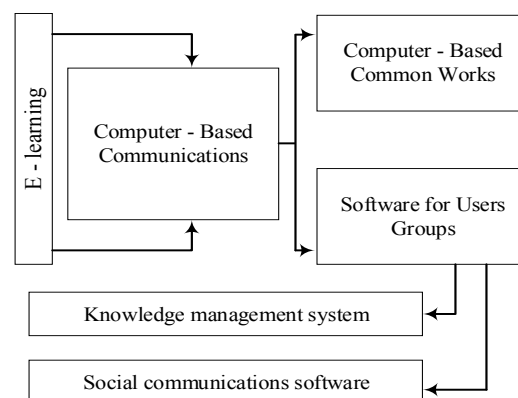


Fig. 2. Computer-based communications

They together define the direction of development of information software, which supports collaborative work in networked virtual environments based on computer communications in the form of systems of support for group interaction. The most common solution is to consider software for user groups as it covers a range of solutions from "clean" knowledge portals in the form of information and communication platforms in education or industry to the

collections of documents and projects. This also includes a wide range of text, audio and video content. Such diverse content can be managed by *moderators* or be part of tutorial knowledge management systems and used by social networking software when achieving the required level of self-organizing content.

Knowledge management systems (KMS) may represent the limits for a particular learning platform in which existing training materials are embedded in a predetermined training scheme that receive an appropriate linkage. Therefore, along with the information platform's function in the KMS, there are wide opportunities for content management, processing, communication, collaboration and the provision of appropriate frameworks (structures) for generating test tasks. An important feature of knowledge management systems is that they have an external organization to fine tuning (adjust) of the system to the real needs of the target group in order to stimulate communication between its members. The given pedagogical tasks are fulfilled basically by applying external moderators, tutors and other entities that determine the structure of pedagogical influence.

The social networking software, in turn, supports interaction, cooperation and communication by means of the computer network, mainly by means of the Internet and the corresponding social community of users in a self-organizing entity. The very aspect of self-organization distinguishes this system from classical knowledge management systems, which are organized for the purpose of networking of knowledge and interests, and is non-professional means but mostly an amateur tool. Typical examples are the above wikis and blogs. For example, Wikipedia is not an official source of data and knowledge, since it is supported on a voluntary basis. Blogs, in general, can be characterized as suprasubjective sources that are tied to the interests of specific individuals or groups.

The effectiveness of knowledge sharing in these tools can be assessed by computer-based tools, for example, by case method. The task of such cases will be to ensure that students make the most of the use of forums and blogs to share knowledge, which will confirm the exclusive role of these tools. In IT terms, this would mean approaching a pedagogically sound level of computer-based moderation with a controlled participation of a teacher or, without his participation at all. One of the important tasks in this context is to simulate the "intervention effect" of the traditional teacher-moderator in the real forum of students of his training course to the level of computer-based analogues, which can have a programmable logic of pedagogical influence, which, in importance, will fully correlate with the influence of the traditional teacher in the real audience.

So, we see that in the chosen tools of social and communication interaction, the pedagogical effect is programmed and it is laid directly on the effect of interference in the process of information exchange by the moderator (traditional teacher, computer program). In fact, the pedagogical role of the moderator will be the reflection of the pedagogical activity of the traditional teacher or a certain pedagogical staff which will allow to as much as possible substantiate the pedagogical conditions of the functioning of the traditional and electronic moderator. Thus, the working hypothesis is confirmed that the application of the well-known informational modeling method in the form of the matrix of coincidences "action of the moderator-pedagogical influence" should be considered as the main information carrier for generating corrective pedagogical influences.

The above-mentioned scientific and pedagogical conditions for creation of new entities of information and communication

interaction in electronic learning allowed to investigate their influence on the educational process as a whole, which is accompanied by the exchange of knowledge with the use of such means as a computer-based forum and such an additional information *social network communication* tools like wikis and blogs. Note that blogs are the most personalized sources of subjective knowledge, and wikis are mediated sources of knowledge with a high level of objectivity which is ensured by a verified, highly individualized or collective moderation.

III. CONCLUSIONS

This research presents the methodological aspects of the theory and practice of computer-based learning, which is an important prerequisite for the creation of such scientific and pedagogical conditions of the educational process in technical universities. It is desirable to provide there possible and accessible *knowledge exchange*. Each participant will be able to share his/her knowledge with all the others and, at the same time, effectively apply the new available knowledge to solve their own educational or professional tasks. We can now observe the same in the *IT area* by means of Facebook, LinkedIn, Viber etc.

The importance of this trend in modern pedagogical science in general, is reduced to the fact that the modern post-industrial information society is constantly moving towards a level of knowledge-oriented society, but in the industries like IT this future is much more close than anywhere else and here the formula "knowledge equals job" works pretty well.

Thus, the essence of the transformation will be that if in the information society the main production result is information and most technologies are focused on the processing of such information, then the main product currently will be knowledge that will mean a qualitatively new level of human development on the basis of current and future *computer-based communication*.

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