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THE MODERN TRENDS OF DEVELOPMENT OF STANDARDIZATION OF THE REQUIREMENTS TO EDUCATIONAL ICT TOOLS

Yulia Zaporozhchenko

Institute of Information Technologies and Learning Tools of the National Academy of Pedagogical Sciences of Ukraine (Kyiv).

The article presents current trends of informational and educational environment development in terms of defining and standardization of the requirements to educational ICT, use of prospective technologies and innovative approaches to the implementation of e-learning systems. The problems of implementing of quality management methodology in a sphere of high-tech products, as well as future prospects of development of e-learning tools are outlined.

Keywords: *educational ICT, quality of ICT, learning environment security, standardization of e-learning, cloud technologies.*

Currently under conditions of intensive development and implementation of the information-communication technologies in all spheres of education, the new approaches, methods of learning and forms of educational activity are appearing, the innovative educational technologies are generated. Expansion of modern tools of information and educational environment, such as educational portals and sites, electronic libraries and editions, electronic resources and information-communication networks, tools and methods of distance learning – all of them enrich and enhance the learning process. The modern trend is the significant extension of the range of e-learning technologies application.

Therefore there is need for scientific and methodological research that would aim at finding out some integrated approaches to the educational environment organizing so that it could give more opportunities for integrating, organizing and selecting the necessary resources. It is known that the key to successful implementation and use of ICT in education is not only the availability of the necessary software and hardware resources, computer technologies or electronic educational content quality. It is much more important to organize these resources in e-learning process, so that it would be possible to assure access to them for all interested users (students, teachers, managers, etc), anywhere and anytime they need [7].

That is why the issue of evaluation of didactic stuff for e-learning, identifying the ways of their selecting and applying, remains the more problematic one. Due to this aspect the compliance with a set of requirements to the resource support and management, interface design, ergonomics, etc is a prerequisite of its successful use. Unfortunately, in Ukraine, comparing to experience of foreign countries, we should still notice the significant lagging in the use of information technologies for educational systems development in the technological, didactical, methodical and psychological aspects. One of the possible ways of solution of this problem is the research of quality assurance foreign experience in technologies, scientific and methodological principles of standardization of the requirements to ICT, their adaptation in educational environment of Ukraine.

Many of leading Ukrainian scientists have devoted their papers to the research of the problems of educational ICT implementation and their quality evaluation. We should mention the works of V. Bykov, A. Gurzhiy, M. Zhaldak, A. Manako, S. Rakov, O. Spirin, O. Spivakovsky, M. Leshchenko, O. Ovcharuk, M. Shyshkina, K. Skrypka, V. Lapinsky, G. Lavrentyeva, etc. However, the problem of quality evaluation, standardization of requirements to educational ICT demands the further scientific research.

The aim of our study is to analyze the current state of standardization of requirements to educational ICT, and to identify the international trends of development of prospective IT.

The quality assurance of the electronic learning tools is aimed at searching the effective methods, approaches and organizational forms of their creation, implementation and using. This fact requires the outlining of the requirements to ICT with taking into account the trends of their development.

The main reason for difficulties in modern ICT implementation is the issue of their inclusion into educational process, identifying the methodological and scientific basis of their use. After all, it is identified on the basis of methods, approaches and technology of research of educational ICT quality. In this context, we can identify some directions, aspects, under which one can examine the problem of education quality evaluation. In particular, there is a problem of choosing parameters, methods of evaluation, techniques and informational tools, implementation of the research, issues of its providing, etc. The variety of software tools to solve such problem involves the question of their quality. This leads to the need to develop the methods of software quality evaluation, defining its accordance to the current requirements that would help us to choose out of many alternative products with similar functional characteristics.

Working out the characteristics of software quality is one of the most important stages of quality assessment process, as the reliability of an assessment process depends on the completeness and adequacy of a system. The problem of software quality characteristics development does not lose its relevance, because it is impossible to create a universal system of requirements for all classes of software. It is also impossible to create a unified system of quality characteristics, because of continues software changing and updating. The difficulty of determining the parameters of psychological and pedagogical assessment of electronic products quality and development of assessment methods can be explained in a way that such factors as "reliability", "convenience", "clarity" and others can not be measured. To be assessed they must be determined by using the characteristics of quality, which must be fairly simple.

How can we determine which tools and technologies are the most productive ones for learning activities and help to achieve the required level of educational quality? The answer to this question depends on the content of e-learning, and on the approaches to assessment of e-learning tools and systems [3].

Quality of e-learning and its assessment includes many factors, such as content of education; level of didactic and methodic materials; pedagogues' qualification; technical supply; educational management; knowledge and competencies of students, etc. Very important the indicators of tools' practical value are. Thus, the educational computer program, which has a complex interface and demands a lot of time to be mastered, distracts students from the main subject, leads to inefficient expenditure of time. Obviously, the quality of such program is relatively low. One aspect of practicality of program, its quality indicator is the similarity of performance procedures in virtual and physical environments.

An important characteristic and requirement to modern educational ICT is the security of educational environment, which includes analysis of risks and benefits of using the computer technology. In e-learning systems the factors of health maintaining, development of students' intellectual potential must be considered [5]. There are various options that can minimize risks and maximize the efficiency of search, for example, search system of 'kids.yahoo.com' [10]. Development and implementation of the security tools into educational process is an essential point of e-learning.

Among the major reasons preventing wider implementation and use of high-quality e-learning systems there are material-technical problems which include insufficient number of computers, software and necessary services, Internet access (including broadband), connection speed, etc. We should also pay attention to the availability of important information, availability of user-friendly search capabilities and selection of essential learning materials. A separate set of problems is associated with the development of standards and requirements to educational software.

In particular, it concerns the definition of psychological, pedagogical and didactical parameters of educational resources quality assessment.

Many authors (S. Sanz-Santamaría, Á. Vadillo Zorita José, J. Gutiérrez Serrano and others [8]) agree in opinion that although the e-learning standards have been developed to identify ways of using the educational objects, realized by means of ICT, standards likely contributed to further search in this area than proposed the concrete solutions.

Now the problem of standardization of educational ICT is of great importance in context of open learning environment formation that provides flexible access to educational resources, changes in pace of learning, its content, temporal and spatial boundaries, depending on the needs of users [1].

Implementation of standards in the sphere of educational ICT allows: to coordinate the implementation of educational software, its functionality; to create commercial products and determine the range of their implementation; to receive wide acceptance and recognition; to minimize the possibility of errors, etc. There is a tendency for the coordination and unification of standards, didactic materials developed by various organizations for standardization, such as IEEE, IMS, ISO / IEC JTC1 SC36 and others, as well as harmonization of national standards with the international ones.

Although Ukraine has developed a legislative basis for the certification of organizations and institutions and is involved in international standardization processes, still the range of problems exist, that hinder successful integration into the European space. In particular, Ukrainian certificate is not valid outside the state. For true recognition it is necessary to pass certification under ISO 9001:2000 in special institutions, such as ABS Quality Evaluations (USA), Lloyd's Register Quality Assurance (UK), TUV (Germany), Bureau Veritas Quality International (France), etc. It is necessary for those companies, including educational institutions, that offer goods and services to foreign clients and which intend to create a worthy competition to foreign colleagues.

Nowadays we should notice that Ukraine is much behind comparing the most developed countries in the sphere of standardization, as well as equipment and methodologies. The educational ICT quality improvement can be carried out only by considering global trends, adapting the best experience to the state conditions of Ukraine, while special emphasis should be made on improving the quality of information technology.

One of the main reasons for poor quality of educational ICT is that the theoretical basis of their quality evaluation is not developed enough. That's why it is required to provide the systematic research, optimization and parameterization of the criteria of educational ICT quality, defining and testing the effective methods that are designed to establish the compliance of the educational electronic media and technology with some objective psychological-pedagogical requirements. Today, it is imperative to accelerate computerization of educational establishments and their connection to the Internet, which must involve both the state budget and resources of IT sector.

There are different ways to solve these problems, among which we can mention the following:

- creation of analytical information center of monitoring of the status and nature of changes in the educational system, and of forecasting trends in the information society, on the basis of Ministry of Education, Youth and Sport of Ukraine;

- development of a comprehensive program of standardization of informational tools harmonized with international ones, which should help eliminating the strategic backlog of Ukraine in terms of information from advanced foreign countries and to accelerate its entry into the information society;

- a comprehensive review of standards obsolete in comparison with their modern counterparts ISO/IEC;

- accelerating the implementation of the analogues of ISO/IEC standards;

- development of regulatory procedures for writing off obsolete equipment;

- development of the new version of the State sanitary norms and rules of arranging school computer-classrooms and mode of students' work on personal computers;

- special teachers' training aiming to form their informational competencies, ability to work with advanced learning technologies in new conditions of educational environment, professional networking;

- provision of computer-classrooms by software enough for teaching both informatics and other subjects;

- promotion of state network creation for consolidation of resource centers and foundations of didactic-oriented software and systems, creation of portal for methodological teachers' support on the effective use of ICT.

Now there is a need to develop not only approaches of balanced selection of information resources, but also informational technology training platforms on which they are posted. Electronic resources evaluation is especially urgent in view of the intensive development of delivery resources tools, change of forms and methods of management e-learning systems. Possible way of solving the problems of implementation and use of electronic learning resources (ELR) is creation of the national educational network using information and communication technology-based standard 4G.

The unified national information educational environment (educational portal), or UNIEE is the information and telecommunication environment that is created on Internet-based resources and provides ELR control, administration of the secure access to information in Internet, that helps the users in searching for relevant educational, methodological, reference information, representing information from different sources in common way. This environment includes the necessary for the educational process resources for different categories of students, teachers, parents, administrators and managers of UNIEE.

The interesting and relatively new services are conventionally called "cloud" or "cloud computing". Ander the cloud computing model it is possible to implement flexible network access to the general fund of computing resources (eg, networks, servers, data files, software and services) that can be quickly granted, providing the minimum of administrative effort and interaction with the supplier [2]. Among the advantages of "cloud" we should mention: flexibility in using different types of software without its purchase or upgrade, streamline licensing and software support, the possibility of multiple access to educational resources, simplification of calculation processes and maintaining large arrays due to special cloud applications, the possibility of mobile learning, etc.

An essential feature of cloud technologies is the prospect of creation of a unified infrastructure of parallel and distributed computing for the development and integration of various types systems and resources on this basis [2]. It allows everybody to use cloud computing in different areas of e-learning. With the development of cloud computing technology the features, functionality and access to electronic resources has been much increased. For this reason, the development of effective educational resources quality evaluation methods will improve their performance. Thus, cloud computing technology is a prospective direction of electronic resources development as they presuppose more sophisticated methods of multiple accesses to electronic resources, and supply a uniform methodology of a single platform, the basis for development, testing and improvement of integrated quality assessment methods [9].

Of course, the technology continues to evolve rapidly. New hardware and software products appear improving the existing ones, including the didactic products. Besides the cloud technologies development we can see the future prospects for electronic educational tools in the following areas:

- providing the new learning tools which reduce the amount of routine work, reduce working on educational problems and getting results;

- learning process monitoring, creation of objective basis for evaluating the educational achievements of the group, class or individual student;

- use of multimedia to illustrate the didactic material, which complement traditional or replace those ones that are inefficient in the assimilation of knowledge;

- provision the teacher by new learning tools that allow effective planning for organizing the educational process;

- giving the access to the teachers for efficient organized renewable knowledge data base, made in linking hypermedia form;

- creation and promotion of online systems for sharing the teaching experiences.

In conclusion we should be confessed that in Ukraine the activity for informatization of education sector is implemented; the implementation of new ICT in the learning process, their standardization is realized; the researches in the sphere of education computerization are actively conducted. However, the problem of evaluation of new learning tools quality is not developed enough. It is necessary to conduct the scientific and methodological researches aimed at development of educational institutions informatization in the direction of improving their methodological and organizational support for the use of ICT, improvement of quality assurance system in the sphere of educational ICT.

In further work we plan to develop the legal framework of e-learning; to design the scientifically grounded psychological and pedagogical requirements to information and communication technologies of computer-based educational environment; to support educational institutions in shaping the modern learning environment with the use of ICT.

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