

# CLASSIFICATION OF WEB RESOURCES IN THE MODERN INFORMATION SOCIETY

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**Abstract.** The article substantiates some features of the classification of web resources in the modern information society. The purpose of web resources is to strengthen intellectual capabilities in the information society, as well as to improve the quality of education at all levels of the educational system. To ensure the objectivity and comprehensiveness of the research, a complex of general scientific and pedagogical methods was used, including: analysis of the literature on the researched problem to determine the state of its development and research prospects; comparison to study the points of view of different scientists; systematization and generalization for conclusions; observation of the educational process. The use of educational web technologies is highlighted and the purpose of using web resources is analyzed. The main pedagogical goals of using web resources are highlighted. It is shown by which features digital educational resources (DER) can be described. It is clarified that information technologies are a condition for the development and use of digital educational resources. It is emphasized that the purpose of using web resources is to strengthen intellectual capabilities in the information society, as well as to improve the quality of education at all stages of the educational system. We considered the classification of digital educational resources. It was noted that they can be described according to the following characteristics: according to functional classification; based on the materials of scientific publications; by structure; according to the organization of the text; according to the nature of the source data; according to the intended purpose; by user group; by the availability of a printing equivalent; by information type; by the degree of didactic provision; by educational and methodical functions; by the nature of user interaction; by distribution technology and depending on the form of ownership. Note that the digital revolution will continue to fundamentally change the way citizens live, work and study. The spirit of innovation and entrepreneurship in education and training must be stimulated and supported by clear political will and efforts to bring innovation into everyone's lives. Innovative practices need to be shared, discussed and disseminated. In the context of new approaches, which also include a digital learning environment, thanks to the digital participation of both teachers and students, they should be constantly interested in improving courses and curricula, self-awareness of the need for continuous training in digital literacy, which will greatly contribute to the transformation of digital universities.

**Keywords:** web resources, information technologies, education, digital educational resources, digital literacy.

**JEL Classification:** I 23, I 29

**Formulas:** 0; **fig.:** 0; **tabl.:** 0; **bibl.:** 25

**Introduction.** The world we live in is going through an era of digital revolution. The Internet, the trend towards globalization. The rapid growth of information and communication technologies (ICTs) and technology-enabled enhancements of work environments have enriched and enhanced people's professional activities and lives, including the way they work, learn and communicate. In turn, these rapid changes have led to increased information overload and complex situations that require an increased digital skill set. The development of new literacy is a decisive factor for effective functioning in the era of digital technologies, which allows you to feel more fulfilling and productive work. New literacies in today's digital society have been the focus of considerable research and educational attention over the past decade. The 21st century has witnessed important key competencies and, as a result, an increase in research related to technological, information, visual and communication literacy. All these skills constitute the so-called digital competence, one of the basic competences that, according to the European Parliament, every citizen should acquire for lifelong learning. It is difficult to imagine the educational process as a whole without the wide use of various educational technical means and web resources. The first should include the entire complex of computer, multimedia and technical equipment of the educational process - computer workstations, multimedia projector and screen, laptop, interactive whiteboard, modern computer simulators and servers for using pedagogical software and other electronic tools.

Web resources combine a wide range of pedagogical software tools, electronic textbooks, electronic tests, computer models, simulators, didactic games, and stimulators that differ in purpose, level of complexity, form of technical implementation, and interface types [14].

The use of web technologies in the field of education allows teachers to qualitatively change the content, methods and organizational forms of education. The tools of pedagogical activity are being improved, the quality and efficiency of education are increasing. Web resources have a lot of advantages compared to traditional means of education.

**Literature review.** A comprehensive analysis of the scientific works of Ukrainian and foreign scientists shows that the problem of using web technologies is an actual subject of research by many scientific schools and individual researchers. The problems of informatization of education, the use of multimedia technologies, the analysis of the pedagogical potential of informatization of the educational process are revealed in the works of scientists V. Bykov, M. Zhaldak, Yu. Kazakov, A. Kolomiets, V. Madzigon, Yu. Mashbyts, I. Prokopenko, O. Shlykov etc.

**Aims.** The purpose of web resources is to strengthen intellectual capabilities in the information society, as well as to improve the quality of education at all levels of the educational system.

**Methodology.** To ensure the objectivity and comprehensiveness of the research, a complex of general scientific and pedagogical methods was used, including: analysis of the literature on the researched problem to determine the state of its development and research prospects; comparison to study the points of view of

different scientists; systematization and generalization for conclusions; observation of the educational process.

**Results.** The following main pedagogical goals of using web resources can be identified:

- intensification of all levels of the educational process due to the use of modern information technologies (increasing the efficiency and quality of the learning process; deepening intersubject connections; increasing the volume and optimizing the search for the necessary information; increasing the activity of cognitive activity);
- development of the student's personality, preparation of the individual for a comfortable life in the conditions of the information society (development of different types of thinking; development of communication skills; aesthetic education through the use of computer graphics, multimedia technology; formation of information culture, ability to process information) [9, 19 -21].

Nowadays, the development of information technology is changing every day, and the development and application of multimedia technology has achieved fruitful results. The technologies of mobile internet, internet of things, big data, cloud computing, virtual reality, artificial intelligence are becoming more and more mature, personal terminal devices such as computers are popular at home. Advances in social sciences, education, and humanities research, and portable devices such as tablets, e-readers, and smartphones are widely used in work, study, and life. Information technology is a condition for the development and use of digital educational resources. With the development of information technologies, more and more digital educational resources are developed and used, and different information technologies and their cross-integration will have different effects on the manifestation and functions of digital educational resources [2, 16-18, 20-21].

At the stages of the lesson, when the main educational influence and control is transferred to the computer, the teacher gets the opportunity to observe and record the manifestation of such qualities in students as awareness of the purpose of the search, active reproduction of previously learned knowledge, interest in replenishing knowledge from ready-made sources, independent searches. This will allow the teacher to design his own management activities and the gradual development of students' creative attitude to learning. Providing benchmarks for checking educational activities (through educational tasks or computer programs), providing an analysis of the causes of errors allow students to be gradually taught self-control and self-correction of educational and cognitive activities, which should be in every lesson.

Web resources are an important tool of the educational process, have an educational and methodological purpose and are used to ensure the educational activities of students and are one of the central elements of the information and educational environment [9, 21-25].

Digital educational resources (DER), in particular web resources, can be described according to the following features:

- by functional classification;
- based on the materials of scientific publications;
- by structure;

- according to the organization of the text;
- according to the nature of the source data;
- according to the intended purpose;
- by user group;
- according to the availability of the printing equivalent;
- by information type;
- according to the degree of didactic support;
- by educational and methodical functions;
- by the nature of user interaction;
- by distribution technology;
- depending on the form of ownership [11].

By functional classification.

According to the functional property, which characterizes the meaning and place of the central educational process in the educational process, they can be classified as:

- educational and methodical TSRs;
- methodical TSRs;
- educational CSOs;
- auxiliary CSOs;
- controlling CSOs [9].

According to the materials of scientific publications: - electronic textual analogues of printed publications, such as books, magazines, etc. (it is assumed that the textual information contained in them is presented in a form that allows character-by-character processing);

- electronic images of printed publications, when elements of the latter (for example, pages) are presented as complete graphic images, the same type of electronic information includes images of handwritten materials

– facsimile;

- databases that meet the requirements for electronic information, for example, bibliographic, address, statistical, linguistic, full-text databases belong to the same type, if they do not fully reproduce printed editions;

– new forms of publications that do not have printed counterparts, such as electronic announcements, materials of electronic conferences and other electronic messages available to users through telecommunication networks;

- electronic publications of audio and video information;

– multimedia products (interaction of visual and audio effects under the control of interactive software, as well as a combination of text, graphic images, sound, animation and video elements) [13];

- software products (software intended for delivery to the user);

– combined software and information products, for example, geoinformation systems (information systems designed for collection, storage, analysis and visualization (output) of spatial data) [8];

- electronic games [10].

Digital educational resources can be structurally divided into:

- single-volume (issued as one electronic medium);
- multi-volume (consist of two or more numbered parts, each of which is presented on a separate medium, but at the same time is one whole both in terms of content and design);
- electronic series (a collection of volumes united by a common theme and purpose and published in the same format).

Digital educational resources according to the organization of the text are divided into:

- mono-edition (includes one work, for example: a textbook, a study guide, a course and a synopsis of lectures);
- collections (includes several works of educational literature - a workshop, a textbook, a book for reading).

According to the nature of the source data, the following traditional types of digital educational resources can be distinguished: curriculum, curriculum, methodological guidelines, practice programs, tasks for practical classes, lecture notes, a course of lectures, a workshop, etc.

By purpose, digital educational resources can be divided into:

- official (published on behalf of state bodies, institutions, departments or public organizations, containing materials of a normative and directive nature);
- scientific (contain information about theoretical or experimental research, historical documents);
- popular science (contain information about theoretical or experimental research in the field of science, culture, technology, presented in a form accessible to a non-specialist reader).

- reference;

- advertising [7; 11].

According to the group of users, it is possible to divide into CSOs:

- for schoolchildren;
- for students;
- for masters;
- for pedagogical, scientific-pedagogical, scientific and administrative employees of educational institutions;
- for education seekers;
- for certified specialists;
- for partners and volunteers who are ready to contribute to the development of digital education, access to quality educational materials, information services [15].

The following groups of digital educational resources are distinguished according to the availability of a printed equivalent:

- electronic analogues of paper educational editions (editions that reproduce the corresponding paper edition (location of text on pages, illustrations, links, notes, etc.);

- an electronic analogue of a printed edition (an electronic edition (presented in pdf, doc, jpg, djv, djvu, html, etc. formats), which basically reproduces the corresponding printed edition);

- electronic demonstration materials (electronic materials (presentations, diagrams, video, audio recordings, etc.) intended to accompany the educational process);

- independent TSOs (do not have paper analogues (exist only in electronic version));

- electronic educational content (a form of transmission of information, cultural and historical heritage, exchange of life experience and knowledge transmitted through websites, videos or various programs) [7].

The classification of TSR by information type is divided into:

- TSR with text information;

- CSD with visual information:

collections: illustrations; photographs; portraits; video fragments of processes and phenomena; demonstrations of experiments; video tour;

models: 2-3 dimensional static and dynamic; objects of virtual reality; interactive models, symbolic objects: schemes; diagrams; formulas, maps for subject areas;

multimedia environment (information and reference sources, workshops (virtual constructors), simulators and test systems, programmed training aids (electronic textbooks, virtual tours, etc.) [3];

- TSR with combined information (textbooks; study guides; primary sources and anthologies; books for reading; problem books; encyclopedias; dictionaries; periodicals);

- TSR with audio information (sound recordings of performances; sound recordings of musical works; sound recordings of living nature; sound recordings of inanimate nature; synchronized audio objects);

- Centers with audio and video information (audio and video objects of animate and inanimate nature; subject excursions; encyclopedias);

- interactive models: (electronic laboratory workshops; subject virtual laboratories, electronic didactic demonstration materials (presentations, diagrams, video and audio recordings, etc.), designed to accompany the educational process).

- TSRs with a complex structure (textbooks; study guides; primary sources and anthologies); original texts (textbooks; texts from special dictionaries and encyclopedias; texts from scientific, popular science, educational, fiction, etc.) that do not repeat stable textbooks [4].

By degree of didactic support:

- TSR, which covers the specialty;

- TSR, which covers the discipline;

- TSR, which covers the topic (section) of the discipline;

- SDG, which covers part of the topic.

**Discussion.** According to educational and methodical functions, digital educational resources are used for:

- for lecture accompaniment (slides, video fragments, audio accompaniment);

- to accompany the workshops;

- for independent work;

- for distance learning;
- for self-education;
- for short-term courses and for the system of professional development [5].

According to the goals of using the SDGs in the educational process and their capabilities, the following types of SDGs are distinguished:

According to the nature of user interaction, two groups can be distinguished:

- deterministic (parameters, content and method of interaction, which are defined by the publisher and cannot be changed by the user);
- non-deterministic (interactive) (parameters, content and method of interaction with which are directly or indirectly set by the user in accordance with his interests, purpose, level of training, etc., based on specific data and with the help of algorithms defined by the publisher).

According to the distribution technology, the following groups are distinguished:

- autonomous - are characterized by the fact that their use is carried out autonomously on the user's computer without the need to connect to the network. In addition, the amount of these resources can be arbitrary depending on the power of the computer and its hardware;

- network - installed on the server and used when connected to the network.

The amount of resources that can be used depends on the bandwidth of the network;

- combined - are usually used when combining autonomous and network CSOs.

The main CSOs are used autonomously, and their management and interaction of the client computer with the server is carried out using the network.

Depending on the form of ownership:

- open (their use is free);
- closed - their use is carried out only with permission. Having permission, the user must enter his login and password, which are issued by the developers' administration;

- combined (access to individual parts or the entire OER is free, but in demonstration mode (so-called demo versions) [11].

As a rule, information sources include separate information objects: elementary information objects (which, if it is possible to separate them, can be used independently within the framework of information systems) and complete full-fledged information sources.

Elementary information objects can be considered: as an organic component of the traditional educational process, which does not replace, but complements and expands the possibilities of traditional, methodically appropriate means of education, thereby increasing the effectiveness and quality of education; as objects of designing an educational and informational environment within the framework of pedagogical design with the use of tools, which will increase the effectiveness of the use of ICT in the educational process.

Finished full-fledged information sources - final digitized products covering the entire educational course or section (theme) are considered as a meaningful component of IT, which determines their main functionality.

Informational and educational final digitized products (original texts that do not repeat stable textbooks) are considered as additional to the main ones [1].

**Conclusions.** So, we considered the classification of digital educational resources. It was noted that they can be described according to the following characteristics: according to functional classification; based on the materials of scientific publications; by structure; according to the organization of the text; according to the nature of the source data; according to the intended purpose; by user group; by the availability of a printing equivalent; by information type; by the degree of didactic provision; by educational and methodical functions; by the nature of user interaction; by distribution technology and depending on the form of ownership.

Note that the digital revolution will continue to fundamentally change the way citizens live, work and study. The spirit of innovation and entrepreneurship in education and training must be stimulated and supported by clear political will and efforts to bring innovation into everyone's lives. Innovative practices need to be shared, discussed and disseminated.

In the context of new approaches, which also include a digital learning environment, thanks to the digital participation of both teachers and students, they should be constantly interested in improving courses and curricula, self-awareness of the need for continuous training in digital literacy, which will greatly contribute to the transformation of digital universities.

Today, major universities have opened their doors to the online sphere in the sense of expanding access to education for anyone regardless of geographic region, age, gender, race, ethnic origin.

Digital educational resources enable the education of a large number of participants in the educational process with different goals, interests, knowledge and skills to help create a community of lifelong learning.

**Author contributions.** The authors contributed equally.

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