

Possibilities of Using Multimedia Technologies in Education

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Summary

The article substantiates the need for widespread use of information and communication technologies as an important factor in accelerating scientific and technological progress, automation and intensification of production, creation of new high-performance technologies, improving planning and management. The expediency of creating a global distance learning system, which, thanks to new information technologies, allows direct communication between those who teach and those who learn, regardless of the physical distance they are from each other. The types of multimedia information that helps to present knowledge in different formats are distinguished. The advantages of the use of multimedia technologies and the main directions of practical use of multimedia technologies in education are clarified. A number of factors that contribute to improving the effectiveness of learning in the use of multimedia are outlined. It is stated that the use of multimedia technologies in the educational process of higher education institutions allows to move from a passive to an active way of implementing educational activities, in which the student becomes the main participant in the learning process. When choosing multimedia teaching aids, the teacher must take into account the uniqueness of a particular subject, to provide for the specifics of science, the conceptual apparatus, the peculiarities of methods of studying its laws. Multimedia technologies must meet the goals and objectives of the course and be an integral part of the learning process.

Keywords:

multimedia technologies in education; theoretical aspects; distance learning system; factors that increase the effectiveness of learning when using multimedia; types of multimedia information;

advantages of using multimedia technologies; main directions of practical use of multimedia technologies in education.

1. Introduction

The current stage of development of society is characterized by profound economic and social transformations based on the widespread use of scientific and technological progress in all spheres of human activity. One of the important factors in accelerating scientific and technological progress, automation and intensification of production, the creation of new high-performance technologies, improving planning and management is the widespread use of information and communication technologies. The use of multimedia technologies in education opens up great opportunities for creativity of teachers and students, expands the range of professional and research tasks and at the same time puts qualitatively new requirements for teacher training, their readiness to use computer technology in professional activities.

The development of media education in Ukraine is based on the best world experience reflected in international documents, recommendations and resolutions, such as the Grunwald Declaration on Media Education (1982), the UNESCO Resolution on Critical Media Education (Paris, 1989), the Vienna Conference on Education for Media and the Digital Age (1999), the Seville Youth Media Education Conference (2002), the UNESCO Paris Media Education Program (2007), the European Parliament resolution on media literacy in the digital world (2008), and others.

Informatization of society necessitates the use of multimedia technologies in education, training of qualified

personnel of the relevant profile for all spheres and spheres of public life. In the era of informatization, the role of education is growing rapidly, because education is the basis of socio-economic and spiritual development of society. Currently in Ukraine there is a modernization of the education system, its focus on entering the European educational space. The teacher has ceased to be the main source of knowledge for students. They actively use large amounts of information from various sources, such as the Internet, television, computer programs and games, videos, a variety of educational and popular science literature, and more.

The introduction of multimedia technologies in education requires compliance with the training of teachers to the current level of informatization of society. Therefore, one of the global goals of educational informatization is to train teachers who have the appropriate level of application of multimedia technologies, are ready to use them in the educational process and education management, take an active part in the process of educational informatization.

Higher educational institutions of pedagogical profile should form a creative teacher who is able to use multimedia teaching aids to arouse the interest of students, their activity in learning. The specifics of teaching younger students is the visualization of educational material, and one of the most effective ways to ensure it is a visual approach to learning through multimedia learning tools.

Scientists are actively working to find optimal ways to improve the system of training primary school teachers in higher education. One of them, researchers see the improvement of pedagogical education in the formation of professional competence of future teachers, giving preference to the implementation of the most effective concepts and models of teacher training in modern conditions. Ukraine needs intensive development of the process of informatization of the education system. It is urgent for national education to introduce new multimedia technologies into the educational process of secondary and higher education, without which scientific and technological progress is impossible. As we can see, teacher training by means of multimedia technologies is quite an urgent issue. This convinces of the need to study and borrow theoretical developments and practical experience of foreign scientists.

2. Analysis of recent research and publications

Currently, a number of works have been published in which attention is paid to the appropriate use of multimedia technologies: electronic encyclopedias, guides, books, interactive reference books, multimedia educational complexes, pedagogical software products that stimulate cognitive activity, broaden horizons, develop new skills, teaching aids. The use of multimedia products in education

facilitates the perception and assimilation of new material, promotes the mental development of students, increases interest in the subject, encourages independent and creative search for new ideas.

The problem of the use of multimedia in education was studied by American scientists D. Willows, G. Houghton (D. Willows, H. Houghton), studying, in particular, general issues of learning organization, features of teaching subjects with the use of multimedia and computer simulations [17].

According to J. Karbowniczek and M. Grabowski [7], the use of multimedia in the educational process has both positive and negative features [18] M. Sitarczyk [11] notes that multimedia, in particular computer and television, play a positive role in the perspective of a child's development and maturity. According to Z. Kosyrz, the spread of electronic media affects the mentality of modern man [9].

O.Kuchai in his article lights up the conceptual principles of training future teachers by means of multimedia technologies and the use of multimedia technologies in the training of primary school teachers [1; 2].

O. Kuchai, S. Yakovenko, T. Zorochkina, T. Okolnycha, I. Demchenko, & T. Kuchai emphasize about the problems of Distance Learning in Specialists Training in Modern Terms of The Informative Society During COVID-19 [3].

A. Kuzminskyi, O. Kuchai, O. Bida focus attention on the usage of Polish Experience in Training Computer Science Specialists in the Pedagogical Education System of Ukraine [4].

T. Kuchai, O. Biletska, T. Kravtsova, N. Bidyuk, V. Tretko & O. Kuchai give an emphasis to Usage of the Activity Approach in Teaching Foreign Languages in Higher Education Institutions [5].

Analysis of psychological and pedagogical sources shows that multimedia influences the individual, satisfying his cognitive needs (obtaining comprehensive information about the world); affective (formation of new, emotional, as well as aesthetic experience); the need for personal integration into society; the need to reduce psychological stress (providing opportunities for entertainment and leisure). There is no doubt about the impact of the media on recipients, but the level of its intensity varies.

3. Research methods

To achieve this goal, the following research methods were used: theoretical (analysis of philosophical, pedagogical, psychological literature), that allows to justify the starting points of the study; interpretive-analytical method, on the basis of which sources are studied using synthesis, analysis, systematization and generalization.

4. Results

With the development of new technologies, information resources are increasing, creating conditions for the formation of a single global information space. As a result, the education system, which has access to the Internet, has been modernized, and media libraries have been created that serve not just as "windows" but as "open gates" to the world of diverse cultures. This allows the transfer of accumulated knowledge, optimizes the processing of large amounts of information, creates a learning environment as close as possible to reality. An important condition for the implementation of multimedia in the educational space is the availability of modern equipment and structural units responsible for its operation.

The current level of development of information and communication technologies testifies to the expediency of creating a global distance learning system, which thanks to new information technologies allows direct communication between learners and learners, regardless of the physical distance they are from each other [15].

When introducing multimedia technologies into pedagogical education programs, specialists face difficulties in financing, lack of proper qualification of employees, and shortage of allotted study time. These are just some of the obstacles that need to be overcome to integrate multimedia technologies into curricula in particular and into the educational process in general.

The introduction of multimedia learning tools is inevitable, although it is happening gradually.

Multimedia technologies should be used in the context of a variety of learning styles. Students become active participants in open or distance educational process.

Despite the indisputable fact of widespread use of multimedia educational systems in the educational process at all stages and in various forms, there is a significant shortage of educational multimedia tools and programs available to the general user. The use of multimedia technologies can have a positive effect on several aspects of open and distance learning, in particular: to stimulate cognitive aspects of learning, such as perception and awareness of information; increase student motivation; to help in development of skills of joint work and collective cognition; to develop students' fundamental approach to learning, thus, to help form a more thorough understanding of the educational material. Multimedia software helps to increase the effectiveness of open educational activities.

There are two main areas of practical use of multimedia technologies in education: the creation of autonomous multimedia programs and educational complexes; use the capabilities of telecommunications and other technologies to combine multiple multimedia projects and create a multimedia environment.

The use of multimedia helps to increase the effectiveness of learning, as evidenced by a number of

factors, namely: the acquisition of knowledge is not only necessary, but also desired; multimedia is perceived joyfully, and joy in turn stimulates interest in the subject; there is an opportunity to evaluate yourself against the background of the activities of others; the emergence of a new objective criterion for evaluating their own activities; making a creative atmosphere that helps to fantasize, eliminates communication barriers, fear of being funny, getting a negative assessment, etc .; establishing cooperation in the team.

There are three types of impact of multimedia on the individual:

- direct - occurs most often in people who immediately after watching the program often react spontaneously, revealing the state of their feelings (joy, sadness, courage, fear, activity);

- cumulative - stretched in time, usually not noticeable at first; differentiated into separate stages, where the previous prepares for the next; often compared to the mosaic effect, when the effect becomes noticeable at the final stage, after a long time. A classic example of cumulative influence is the result of repeated viewing of the film, which initially generates opposition and criticism, but after a few sessions the negative assessment is softened to complete disappearance; the phenomenon of frequent repetition neutralizes the sharpness of the stimuli received during the first session;

- subconscious - occurs in an unconscious way, the content or image penetrates the human psyche, making itself felt only at the end of the process; is characterized by secrecy of action. To do this, choose new methods designed to influence the individual and society as a whole. Together with their cognition and fixation, their influence on the human psyche ends or at least significantly weakens [19].

The media have become an organic element of family life, subordinating to their laws of life, organization and functioning. The family environment is changing due to the participation of new electronic media, multimedia. Contact with them in the family begins early and lasts throughout a person's life. Electronic media, television, Internet, mobile phone create an unreal picture of the world, competing with the real world.

Scientists claim that multimedia learning is a didactic strategy, which is characterized by the use of adequately selected didactic resources in the learning process. Students have the opportunity to acquire knowledge from various sources of information, to form the skills necessary for further functioning in the modern world. The multimedia learning format enables the acquisition of communication skills in different circumstances, information processing, interaction with other people in the process of working together and solving current problems [10].

From an early age, a person is exposed to various influences through loved ones, as well as more and more often through multimedia, which fills his living space. The

concept of education is aimed at forming a connection between generations, understanding the general potential of human life, which makes a person mature, aware of his essence in a particular culture.

Media education is a field that explains the role of the media in socialization, education and training, preparing people for the organic transmission of information through new technologies, teaches the use of electronic media and prepares for a critical understanding of the semantics of visual culture [15]. Three ways of realization of media education are outlined relate to media education.

Given the humanistic, promising understanding of media education, it should be noted that such training begins at an early age. This is the process of preparing a person for the rational use of electronic media, which is realized in a spontaneous way, in natural life situations. It is based on the child's spontaneous learning (mainly by observing and memorizing) patterns of behavior, ways to use media at home [8].

The use of multimedia technologies in the educational process of higher education institutions allows to move from a passive to an active way of implementing educational activities, in which the student is the main participant in the learning process. When choosing multimedia teaching aids, the teacher must take into account the uniqueness of a particular subject, to provide for the specifics of science, the conceptual apparatus, the peculiarities of methods of studying its laws. Multimedia technologies must meet the goals and objectives of the course and be organic components of the educational process [16].

Currently, various aspects of the use of multimedia in education are being actively studied, differentiating technical and psychological-pedagogical features of multimedia technologies, emphasizing the need for their purposeful and productive use in the educational process of secondary and higher education. Most educators and psychologists note that modern information technology, including multimedia, opens students access to non-traditional sources of information, helps to implement fundamentally new forms and methods of learning using conceptual and mathematical modeling of phenomena and processes that increase learning efficiency [12].

Methodological and practical training of future teachers should be related to practical skills. In the process of learning practical skills, the motivational system for the student's practical actions plays an important role. In addition, the active positive implementation of pedagogical practices is facilitated by the organized contact of the future teacher with the child, the high level of work of school teachers, didactic and scientific activities of academic teachers, as well as their own learning and self-study. One of the main conditions for improving the effectiveness of school education is the qualified preparation of students for the teaching profession.

Methodical and practical training of students is based on:

- interpretations (curricula in the field of social environment at school, textbooks, notebooks);
- proposals (methodical decisions; search by students in the methodical literature of various exercises, tasks, situations which are presented and analyzed at employment in parallel with the program and development of exercises, games, and also didactic means);
- observations (pedagogical practice allows "implementation" of methodical exercises, as well as observation, overcoming typical difficulties that arise in the course of work);
- trial lessons (preceded by joint development of lesson plans and syllabi).

This approach orients students, minimizes student difficulties, offers interesting innovative methodological solutions, and also leads to a confrontation of theoretical innovations with the practical application of didactic work. The process of methodological and practical training of future primary school teachers includes four components: psychological, pedagogical and methodological training; self-study, additional training and improvement of own work (innovation, creativity); practical training (observations, trial lectures); high-quality thorough training (organizational and didactic). Note that these components are interrelated and play an important role in the training of future teachers.

Thus, the education system requires a comprehensively trained teacher who operates with qualified theoretical and subject knowledge, demonstrates a high level of professional, pedagogical and practical training, able to constantly improve. Interdisciplinary knowledge of teachers, their pedagogical talent, individuality and professional competence enable success and influence the future of education.

Of great importance in the outlined problem has recently been distance learning. The difference between distance learning and traditional is clear if we consider them in terms of forms of interaction between teacher and student. The traditional model of teaching is based on lecturing, conducting seminars, laboratory and various types of games, organizing independent work of students and more. Learning base - a book and a teacher as an interpreter of knowledge. Distance learning is focused on the introduction into the educational process of fundamentally different models of learning, which include conferences, project work, training and other activities with computer and non-traditional technologies.

The role of the teacher in this educational process also changes significantly. He is entrusted with such functions as coordinating the cognitive process, adjusting the course being studied, advising students when organizing an individual curriculum, managing their educational projects and more. It helps students in their professional self-

determination. If we consider the features of distance education in terms of communication between teacher and student, we can identify the following characteristics:

- self-education as a basis for distance learning, which involves the student's own motivation for their own learning, as well as a certain level of self-organization of the individual;
- communication between teacher and student on the principle of "one to one", which corresponds to the form and content of individual counseling;
- communication and interaction "to each other" does not preclude the interaction of "one to many", because the teacher, according to a pre-arranged schedule, works with many students. This form of interaction is reminiscent of traditional classroom learning;
- interaction "many to many" means that it is possible to simultaneously communicate with many students who share experiences and impressions.

Based on this, distance learning has a number of advantages over traditional learning: advanced educational technologies, availability of information sources, individualization of learning, convenient counseling system, democratic relations between student and teacher, convenient schedule and place of work.

The introduction of distance technologies in the educational process is aimed at a deeper understanding of the educational material; formation of such competencies as: communicative (direct communication through the network), information (search for information from various sources and the possibility of its critical thinking), self-education (ability to learn independently). As practice shows, if a student does not learn to make decisions independently, determine the content of their educational activities and find ways to implement it, he will not be able to master one or another discipline. In addition, distance learning also performs an educational function - contributes to the formation of leading qualities of personality: activity, independence, self-improvement, creativity [6].

Based on a comprehensive analysis of scientific sources, it can be argued that multimedia is not only information but also communication resources that affect modern society, as well as help to effectively organize the process of learning and education. The range of multimedia implementation in education has significantly expanded: from the use of multimedia technologies in the creation of educational programs to the development of a holistic concept of building educational programs in the field of multimedia, training at the university level in certain areas, the formation of new teaching aids.

Conclusions

Thus, the use of multimedia optimizes the solution of didactic issues with great educational effect, can be a tool

to enhance the effectiveness of learning, significantly reduces the time spent on learning, significantly deepens and expands the range of problems. At the same time, in pedagogical science and especially in the practice of domestic teaching, it is necessary to state the fact that the possibilities of computer teaching aids, in particular multimedia, are not always properly assessed. This is primarily due to the complexity and insufficient level of theoretical elaboration of the concept of multimedia as a didactic tool.

Summarizing the above, we emphasize that the continuous use of multimedia in the learning process has a profound effect on student development. An important task of the school at the present stage is the humanization of the learning process, the formation of students' individuality, the formation of a high information culture. Today requires from the teacher knowledge and skills in the field of application of the latest pedagogical technologies, mastery of advanced methods and tools of modern science.

References

- [1] Kuchai O.V. (2014). Conceptual principles of training future teachers by means of multimedia technologies. Tutorial. Cherkasy: publisher Chabanenko Yu. A.
- [2] Kuchai O.V. (2015). The use of multimedia technologies in the training of primary school teachers. Tutorial. Cherkasy: publisher Chabanenko Yu. A.
- [3] Kuchai O., Yakovenko S., Zorochkina T., Okolnycha T., Demchenko I., & Kuchai T. (2021). Problems of Distance Learning in Specialists Training in Modern Terms of The Informative Society During COVID-19. IJCSNS International Journal of Computer Science and Network Security, 143-148.
- [4] Kuzminskyi, A.I., Kuchai, O.V., & Bida, O.A. (2018). Use of Polish Experience in Training Computer Science Specialists in the Pedagogical Education System of Ukraine. Information Technologies and Learning Tools. 68 (6), 206-217.
- [5] Biletska, O., Kuchai, T., Kravtsova, T., Bidyuk, N., Tretko, V., & Kuchai, O. (2021). The Use of the Activity Approach in Teaching Foreign Languages in Higher Education Institutions. Revista Românească pentru Educație Multidimensională, 13(2), 243-267.
- [6] Datsenko G.V., Suzanskaya Z.V. (2017) Distance learning as a means of stimulating self-education. Distance learning as a modern educational technology: materials of the interuniversity webinar (Vinnytsia, March 31, 2017) / ed. LB Lishchynska. Vinnytsia: VTEI KNTEU, 17-20.
- [7] Karbowniczek J., Grabowski M. (2010) A few words about the separation of the Internet on the psyche, children and youth, in: wybrane zagadnienia, red. W. Grelowska. Radom, 24.

- [8] Konieczna J. (1998) Telewizja – medium wychowujące czy technika? Refleksje nad dziedziną edukacji medialnej w kształceniu wczesnoszkolnym, [w:] Dylematy wczesnej edukacji, D. Klus-Stańska, M. Suświłb (red.). Olsztyn, 165.
- [9] Kosyrz Z. (2005) Osobowość wychowawcy. To be a educator in the faithful and dynamic conditions of the common life. Warsaw. 236.
- [10] Łuszczak G. (2011) Multimedialne programy edukacyjne dla dzieci w młodszym wieku szkolnym. Edukacja elementarna w teorii i praktyce. Dziecko w kręgu kultury masowej. 19. 59-67.
- [11] M. Sitarczyk M., (2005) Bohaterowie telewizyjni w percepcji dzieci sześciolletnich. The context is emotional and social, [w:] Rozwój i edukacja dziecka: szanse i zagrożenia, red. S. Guz. Lublin. 353.
- [12] Multimedia in modern education (2020). URL: <http://www.media-pedagogics.ru/article2.html>.
- [13] Pedagogika. Leksykon PWN, B. Milerski, B. Śliwerski (ed.), Warszawa, 2000, 54.
- [14] Sokołowski M. (2001) Edukacja filmowa jako integralny składnik mediacji medialnej, [w:] Wyzwania pedagogiki medialnej - nowe perspektywy XXI wieku, idem (red.). Olsztyn. 73.
- [15] Shlykova O.V. (2020) Multimedia in the system of continuous education: research and opportunities URL:<http://www.kmtis.ru/kafedra/pedagogi/olgashlikova/sp/pub4.html>.
- [16] Sumina G.A., Ushakova N.Y. (2007) The use of multimedia technologies in the educational process of the university. Successes of Natural Science. 5 URL: <http://masters.donntu.edu.ua/2007/fgtu/dedich/library/sumina/index.htm>.
- [17] Willows D.M., Houghton H. A. (1990) The psychology of illustration. New York: Springer-Verlag. Vol. 1. 152-198.
- [18] Włoch S. (2005) Pedagogika widzialna i niewidzialna w edukacji przedszkolnej. Aspects of development. Child development and education: chances and threats, ed. S. Guz. Lublin, 53.
- [19] Wolska-Długosz M. (2006) Wpływ reklamy na zachowanie się dzieci i młodzieży. Zeszyty Naukowe. 2. 325-335.