

Distance Learning in the Context of E-Learning: Trends of Postmodern Society

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Abstract: The article highlights the trends of the postmodern society developing in the context of a globally integrated world. The postmodern cultural trend is an exponent of the cultural and artistic aspect of the post-industrial world, including the educational aspect. Therefore, such a topic is relevant for research.

The article analyzes the basic theoretical and methodological foundations of distance education as an effective technology of innovative e-learning. Based on the statements of scientists, it is determined that distance education in addition to effective learning technology is also a manifestation of postmodern cultural and artistic worldview. The article defines the essence of distance education in the context of technological process as a feature that forms the global trends of society development. The article also presents the postmodern paradigm as a defining feature of the current worldview of society, which has emerged as a result of innovation and information space.

On the basis of the questionnaire it was determined that distance education as a technology is the most effective in the current postmodern view of the world. The study applied the integrative method of synthesis and analysis, as well as research, descriptive and scientific methods to determine the theoretical foundations of distance education. The questionnaire method was used to determine the effectiveness of distance education in e-learning as a manifestation of postmodernism. The results of the study became the basis for the definition of distance education as an effective learning technology.

Keywords: *Information technology; new dimension of society; value attitudes; competencies; worldview trends.*

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Introduction

Today's society is under conditions of close globalization and integration of different spheres of activity. Humanity is bound by common socio-economic, political and cultural trends, certain common environmental problems, pandemics, infodemic and other manifestations of social development. Information technology, in particular the Internet, strengthens integration in communication and interaction of people in different spheres of activity. New technologies have become the basis for a new perception of the essence of human existence. People realize that their possibilities are limitless in the context of new advances and inventions, while at the same time innovations can completely change the essence of human life and be dangerous to its existence. The postmodern worldview is formed as an ironic perception of the values of the past, which are important because without the past there can be no future - at the same time, past values have exhausted their essence in the context of modern development. The content of education, according to American postmodernists, should move away from the search for some universal theory of education and move to the use of multidiscourse. Postmodernists believe that the new education is based on "post-formal thinking". Postmodern education is characterized by the desire to create new knowledge and self-realization, rather than to reproduce previous ones. Post-formal thinking in education makes it possible to see the connections between opposite phenomena, to consider them against the background of the context. It is characterized by a non-linear interpretation of causality, a consideration of the world as a text, a noospheric interpretation of the connection between the mind and the biosphere.

In the field of education, the role of the student changes from explanation to "interpretation", and education does not just give knowledge, but indicates the direction of development. If earlier education was understood statically, now it is procedural. The postmodern model of education is based on the recognition of equality between the teacher and the student in the educational process, leaving behind the strict dictation, categoricalness of the teacher, recognizing relativism in cognition. Dialogic forms of learning, innovations come to the fore, the content of learning is taken into account, the role of the student in his own construction of knowledge is absolutized. Postmodernism recognizes all forms of knowledge, not only rational, but also other non-rational forms of knowledge - intuition, non-rational discourses, up to the recognition of quasi-theological experience.

Since the society of the postmodern era is globalized, and the development of information and communication technologies intensively changes the opportunities for self-realization of education, distance learning in the context of electronic means the trends of postmodern society. Accordingly, the problem is relevant for the world, because it is the possibility of distance learning that expands the geography of location and the possibility of achieving the goal in a global sense.

Postmodernism was based on the recognition of non-linearity of thinking. It was interpreted as a communicative act, a discourse, which is quite understandable if you observe the trends in the development of modern culture. The postmodern vision of reality adequately reflects the development of widespread use of the Internet, etc. Modern man is immersed in a new virtual reality, and his discourse in many respects corresponds to the global information network. The mixing of various cultural forms and practices, philosophical, worldview, and artistic currents testifies to the fragmentation and fragmentation of modern culture and human consciousness, the lack of unified criteria for evaluating artistic and moral phenomena, the transitional nature of society and culture. There is no common principle that unites different people, but there is an eclectic combination of philosophical, religious, scientific concepts, world wisdom, social myths, national stereotypes and prejudices, with the help of which modern man tries to understand the reality that is changing before our eyes in a situation of radical uncertainty, fluidity, general awareness and heightened suggestibility.

Philosophers recorded the radical change in the situation in culture and its new self-awareness, which replaced the familiar forms of modernism, in the term "postmodernism", which was interpreted mainly as the worldview of the modern age, the corresponding cultural situation.

Thus, the essence of human existence is continuous progress, resulting in new inventions that change human lives. The results of human activity contribute to constant change, which man must master. In order to master the changes, education is necessary as one of the conditions affecting the formation of personality and facilitating adaptation to the challenges of the new dimension of human activity (Gerasymova, 2019; Sheremet, 2019). Therefore, education, in particular distance education, is a key feature that characterizes the postmodern view of the development of today's society (Nerubasska & Maksymchuk, 2020; Nerubasska et al., 2020).

The study is based on the results of theoretical and methodological approaches of scientists in the field of educational activity (Ananiev, 1980; Berne, 1992; Bibik, 2002; et al.). Thus, the main task of educational activity

in the current conditions of educational development reflects the basics of distance learning process in the conditions of postmodernism.

The aim of the article is to analyze and investigate the effectiveness of distance learning as a postmodern condition of education.

Theoretical and methodological foundations of distance education in the era of postmodernism

Today's innovative trends in the development of society determine the main conditions for the production of educational activities. Information technology contributes to the formation and development of a new worldview, defined in terms of post-modern worldview perception of the world. The artistic direction is represented by the style display of different aspects of human activity in the form of spiritual and material values (Vasilyeva & Kononenko, 2016). Stylistic features are defined accordingly to belonging to a historical era, as well as on the basis of the individual style of the artist.

The definition of cultural and artistic direction reflects the educational trends that are the result of certain activities of humanity, as well as education determines the prospective path of development. The educational process covers different categories of society, because the right to education is realized at any age. Therefore, there is a need to establish an effective educational process for both children's audience, for higher education, as well as for adults. Researchers Dewey (1938) & Giddens (1991) and others have studied education in the context of the present information paradigm and argue that the innovation society combines worldview and information perception of the world. According to some scholars, education regulates the relationship between people and builds knowledge on the organization of socio-economic knowledge that contributes to the well-being of each individual separately, depending on their needs (Peha, 2011). Education is a combination of acquired human values and the principles of resource regulation in society.

Since the second half of the twentieth century, the global education system has undergone major structural changes due to the development of scientific and technological progress and its growing influence on all aspects of society. Governments and ordinary citizens have changed their attitudes toward education. Education began to be regarded as a factor of increasing the level of socio-economic development of the country, strengthening its competitive position in the world, ensuring scientific and technological progress and the formation of innovative potential, as well as a factor in solving a number of global problems associated with the survival of

mankind. In this regard, in many economically developed countries education was referred to the priority sectors of investment policy of the state.

At the same time, despite the problems of an economic nature in our country, interest in the basics of getting an education remains at a high level. In addition, the time in which we live is characterized by an increasing pace of change in all areas of society. In this regard, the problem of the adequacy of knowledge received by applicants for education, regulatory, socio-cultural and economic changing conditions is becoming increasingly acute. No less acute is the problem of a significant increase in the information load on the person, caused by the intensive growth of the volume of information, which is especially strong during the period of education in the educational institution.

According to experts, "further growth of the study load is both impossible and inefficient. It is unrealistic in today's conditions of intensive information accumulation to provide an applicant for education with such a stock of knowledge, from which he will be able to constantly draw something needed in specific conditions. Thus, a present-day institution of higher education is faced with the task of creating such a learning environment, which will enable an applicant to master the skills of independent work and to develop the ability to navigate through constantly updated information. Only in this way will the future professional learn to constantly use any opportunity to update, deepen and enrich the knowledge originally obtained, in accordance with emerging needs.

The current situation on the market of educational services has led many specialists to a consensus on the need to create a system of distance education. As a consequence, a system of creation and development of a unified system of distance education was developed.

The main approaches to the interpretation of the concept of "distance learning"

Since the appearance of the term "distance learning" in the early 90s of the twentieth century and until now, its interpretation in official documents and scientific papers is contradictory and debatable. A number of authors interpret the concept of "distance learning" as a form of education, consider it as a type of distance learning (Moiseeva et al., 2004; Vuckovic, 2019).

Another interpretation, officially adopted and enshrined in the law "On Education", reduced distance learning to a technology or pedagogical

approaches used in all normatively established forms of education: full-time, correspondence, part-time, extramural.

This approach to the understanding of distance learning was preserved in the new law "On Education", where distance learning technologies are considered and implemented mainly with the use of information and telecommunication networks in the mediated (at a distance) interaction of students and teachers.

According to the third interpretation, we should speak not about distance learning, but about open education, which provides a new integral form of education, containing all pre-existing forms on the basis of the use of advanced "distance (information and communication) technologies and tools" in them.

The fourth interpretation of the concept "distance learning" implies a new organization of the educational process based on the principle of independent learning of students.

Scientists (Gray, 2008; Vuckovic, 2019) analyze various educational technologies that are most effective during the formation of the information society, in which a person can realize his needs. Each individual can self-actualize and undergoes certain stages of socialization in the process of educational activities.

In today's postmodern society, when one is confronted with the challenges of innovative progress, one must realize that one must form a new conception of norms of social interaction that are more effective in ensuring well-being and success. Postmodernism is an artistic movement arising out of frustration and a desire to establish innovative approaches that are much more effective in responding to new societal challenges.

The worldview of postmodernism is formed on the basis of debunking the notion of dogmas and certain norms of behavior, and on the contrary, the person is aware of his uniqueness and understands that he is able to implement a new idea, perhaps the most valuable in society (Kudykina, 2003). Every individual can realize his or her creative potential by using Internet resources to realize his or her creative idea. This situation quickly changes the "fashion trends" in society. And this is one of the most important positions of the postmodernist view of the world.

Distance learning is an alternative to traditional education and can also be auxiliary in the organization of full-time education. Distance learning expands opportunities for the individual, implements individual needs and can be quite a convenient way to obtain new knowledge and skills (Moiseeva, 2004). Thus, according to researchers, distance learning is a reflection of the postmodern worldview, freeing the individual from

"normality" of behavior, as well as information technology as the main condition for the implementation of distance learning.

Distance learning is also a transformation of society interaction from the real world to the virtual world. Distance learning illustrates the achievements of mankind in the development of information and communication technologies (Kolomiets, 2007). Distance learning is a technology that involves the implementation of the educational process using computer technology (Gygli et al., 2019).

In the context of distance learning use cloud technology, online platforms involving individual tasks, YouTube Channel and other resources (Smith & Schwartz, 1997). In the course of distance learning educational standards are implemented, competencies and value attitudes to themselves, the state, people, etc. postmodern worldview involves a combination of innovation and basic educational standards that form an individual capable of changing the world.

Postmodern worldview interpretation of human cultural activity forms the conceptual provisions of society development. Thus, culture combines artistic, scientific, educational, etc. manifestations of human activity (Padalka, 2008). Postmodern reflection of human activity is aimed at improving technology for progress and evolution of humanity in the future.

A study of the effectiveness of distance learning in the context of e-learning

Under the new dimension of the present, a trend toward a postmodern view of the world order is taking form in the world. This worldview is the result of a combination of information technology and the new needs of human improvement. Man is in a state of search for the latest approaches to the realization of his needs in the new information world (Polat, 2005). As a result of its activities, each individual determines its environment for self-realization. One of the important opportunities for individuality is distance learning.

Distance learning is implemented as an element of e-learning. That is, distance education is synonymous with e-learning, but in a narrower sense. E-learning - a system of learning, which is implemented through the use of information technology as a network virtual learning, mainly providing independent work (Sikorsk, 2011). E-learning is effective for acquiring new knowledge and skills, because in addition to the acquisition of certain competences in the subject, e-learning forms information competence.

One of the most actively developing areas of the current system of education is the implementation of educational programs using e-learning and distance learning technologies. A present-day person needs to constantly study and learn something new in order to remain erudite and versatile, as well as a sought-after specialist in his or her field. Nowadays, education is easy to get from different sources, using computers and the Internet.

E-learning provides for the organization of educational activities using information contained in databases and used in the implementation of educational programs that provide processing of information technology, hardware, as well as information and telecommunications networks to ensure the transfer of communication lines specified information, interaction between students and teaching staff (Noonan, 2017).

Distance learning technologies are educational technologies implemented mainly with the use of information and telecommunication networks in an indirect (at a distance) interaction between students and teachers.

Distance learning is a form of continuous education system, designed to realize the human rights to education and information. Distance learning will make it possible to provide equal educational opportunities for pupils, students, civilian and military specialists, and the unemployed in any part of the country and abroad by more active use of the scientific and educational potential of leading universities, academies, institutes, various industry-specific training and retraining centers, as well as centers for professional development and other educational institutions. Distance learning will make it possible to get basic or additional education in parallel with the main activity of the person. Finally, the distance learning system being created is aimed at expanding the educational environment.

E-learning system is a software product, access to this learning system is via the Internet or a local network, in free mode or by user authorization - by login and password. Most often the Internet browser is used to access the learning system (Vdovych, 2013). The instructor posts instructional material, creates tests using the built-in student testing system. Each user is then given a set of activities to study. The results of the learning process are analyzed by the teacher, generating answers and reviewing test results.

The e-learning system provides the following features:

- Structuring learning material into lessons and courses.
- Each student is given a different set of lessons and courses depending on their status.
- A built-in testing mechanism allows you to check your knowledge.

- The ability to track student activity. For example, if the reports show that a student watched a training video for 15 minutes, but the duration of the video is half an hour, it means that he did not read it completely.

- Convenient analysis of learning outcomes - the e-learning system allows the teacher to generate reports on student testing.

- Typically, the learning system also saves a history of the learning process of each student and allows you to conveniently convert it into Excel spreadsheets or PDF-document.

With the development of the Internet and technology, e-learning is increasingly penetrating our lives. Employee training is becoming an important component in the successful development of a company. Undoubtedly, training centers will continue to prepare training material adapted for use in e-learning, the speed of employee training will increase, and the quality of their training and tools for analyzing their knowledge will improve. E-learning is a relevant solution in today's fast-paced economic world.

The study shows that high resource costs reduce the effectiveness of distance learning. Proper organization of e-learning reduces costs and simultaneously increases the effectiveness of learning. This conclusion can be made on the basis of analysis of the indicators of distance learning activities. The high level of success and established learning competencies indicates a high efficiency of distance learning activities.

Conclusions

The conducted research sheds light on the theoretical foundations of the modern globalized postmodern society. Based on the statements of the researchers, it was established that postmodern ideas of humanity are aimed at the self-realization of the individual in the conditions of informational social development. It is the individual who is able to constantly search for new solutions and implement his ideas, which can be the beginning of a new era.

The results of the study proved that in the second information phase, the individual projects ideas about reality onto the surrounding reality, which are obviously expanded and complicated thanks to knowledge, as well as various scientific concepts and cultural constructs. As a result, he repeatedly structures reality, fitting into it for successful and effective activity.

In post-nonclassical education, knowledge from various sciences is not synthesized into a single theoretical conglomerate, but is retained by the

subject's consciousness, synthesizing knowledge according to the principle of complementarity and using certain knowledge as needed. Postmodern education is open to the sphere of culture, and the individual enters into a constant dialogue with culture to build himself and construct the world. So, it is obvious that the subject of knowledge travels in the space of knowledge, reproduces and creates it.

Postmodern education and culture lead to the construction of a postmodern person - this is a person of transition. With the change of civilization, the mission of education also changes, it begins to be interpreted as a process of self-development of the individual, in which the complexity and non-linearity of the world is captured, and education is considered in the context of postmodern science (theory of self-organization).

Individuality is formed in the conditions of effective educational activities. On the basis of the conducted analysis, it can be stated that distance learning is one of the effective technologies of educational activity.

Distance learning effectively contributes to the development of personality in the modern information society.

In view of the conducted research, it should be stated that distance learning can be organized with the use of information and communication technologies. Thus, Internet resources contribute to effective e-learning, effectively form a competency-based approach to distance learning.

In order to determine the effectiveness of distance learning, a survey was conducted, which became the basis for identifying high success rates and satisfaction with distance learning. The results of the study indicate the high effectiveness of distance learning.

References

- Ananiev, B. G. (1980). *Izbrannyye psikhologicheskiye trudy* [Selected psychological works], Volume 1. Pedagogica.
http://elib.gnpbu.ru/text/ananyev_izbrannyye-trudy_t1_1980/go,2:fs,1/
- Berne, E. (1992). *Igry, v kotoryye igrayut lyudi. Psikhologiya chelovecheskikh vzaimootnosheniy* [The games people play. Psychology of human relations]. Lenizdat.
<https://spbgu.ru/files/05-5-01-008.pdf>
- Bibik, N. M. (2002). Systema formuvannya piznaval'nykh interesiv molodshykh shkolnyariv [The system of formation of cognitive interests of younger students]. In: *Rozvytok pedahohichnoyi i psykholohichnoyi nauk v Ukraini 1992-2002* [Development of pedagogical and psychological sciences in Ukraine 1992-2002] (pp. 410-423). OVS. http://www.irbis-nbuv.gov.ua/cgi-bin/irbis_nbuv/cgiirbis_64.exe?I21DBN=LINK&P21DBN=UJRN&Z21D=&S21REF=10&S21CNR=20&S21STN=1&S21FMT=ASP_meta&C21COM=S&S21P03=FILE=&S21STR=peddysk_2011_10_13
- Dewey, J. (1938). *Experience and Education*. Collier-MacMillan Canada Ltd.
<http://www.schoolofeducators.com/wp-content/uploads/2011/12/EXPERIENCE-EDUCATION-JOHN-DEWEY.pdf>
- Gerasymova, I., Maksymchuk, B., Bilozero, M., Chernetska, Yu., Matviichuk, T., Solovyov, V., & Maksymchuk, I. (2019). Forming professional mobility in future agricultural specialists: the sociohistorical context. *Revista Românească pentru Educație Multidimensională*, 11(4), 345-361.
<https://doi.org/10.18662/rrem/195>
- Giddens, A. (1991). *Modernity and self-identity. Self and society in the late modern age*. Polity Press. https://s3.amazonaws.com/arena-attachments/50002/Giddens_ModernityandSelf-Identity.pdf
- Gray, P. (2008, August 20). A Brief History of Education. To understand schools, we must view them in historical perspective. *Psychology Today*.
<https://www.psychologytoday.com/us/blog/freedom-learn/200808/brief-history-education>
- Gygli, S., Haelg, F., Potrafke, N., & Sturm, J. E. (2019). The KOF globalisation index-revisited. *The Review of International Organizations*, 14, 543-574
<https://doi.org/10.1007/s11558-019-09344-2>
- Kolomiets, A. M. (2007). *Informatsiyna kul'tura vchytelya pochatkovykh klasiv* [Information culture of elementary school teachers]: [monograph]. Vinnytsya State Pedagogical University. <http://www.disslib.org/teoretychni-ta-metodychni-osnovy-formuvannja-informatsiynoyi-kultury-majbutnoho.html>
- Kudykina, N. V. (2003). *Ibrova diyal'nist' molodshykh shkolnyariv u pozaurachnomu navchal'no-vykhovnomu protsesi* [Game activities of junior high school students

- in the extracurricular educational process] [monograph]. Kyiv Polytechnic Institute named after Igor Sikorsky. <http://www.disslib.org/teoretychni-zasady-pedahohichnoho-kerivnytstva-ihrovoju-dialnistju-molodshykh-shkoljariv.html>
- Moiseeva, M.V., Polat, E.S., Bukharkina, M.Y., & Nezhurina, M.I. (eds.) (2004). *Internet-obucheniye: tekhnologii pedagogicheskogo dizayna* [Internet-learning: Technologies of pedagogical design]. Cameron. <https://www.twirpx.com/file/272339/>
- Nerubasska, A., & Maksymchuk, B. (2020). The Demarkation of Creativity, Talent and Genius in Humans: a Systemic Aspect. *Postmodern Openings*, 11(2), 240-255. <https://doi.org/10.18662/po/11.2/172>
- Nerubasska, A., Palshkov, K., & Maksymchuk, B. (2020). A Systemic Philosophical Analysis of the Contemporary Society and the Human: New Potential. *Postmodern Openings*, 11(4), 275-292. <https://doi.org/10.18662/po/11.4/235>
- Noonan, K., (2017). Cyber security for digital government leaders- A guide for government senior executives responsible for leading digital initiatives. CISCO, https://www.cisco.com/c/dam/global/en_sg/assets/pdfs/cisco_whitepaper_govt_cyber_security_digital_20170504.pdf
- Padalka, H. M. (2008). *Pedahohika mystetstva. Teoriya i metodyka vykladannya mystets'kykh dystsyplin* [Pedagogy of art. Theory and methodology of teaching artistic disciplines]: [monograph]. Education of Ukraine. <https://lib.kherson.ua/publ.pedagogika-mistetstva-978-966-8847-79-0>
- Peha, S. (2011, June 28). Agile Schools: How Technology Saves Education (Just Not the Way We Thought it Would). *InfoQ*. <https://www.infoq.com/articles/agile-schools-education>
- Polat, Y. S. (2005). K probleme opredeleniya effektivnosti distantsionnoy formy obucheniya [To the problem of determining the effectiveness of distance learning]. *Open Education*, 3, 71-77. <https://cyberleninka.ru/article/n/k-probleme-opredeleniya-effektivnosti-distantsionnoy-formy-obucheniya>
- Sheremet, M., Leniv, Z., Loboda, V., & Maksymchuk, B. (2019). The development level of smart information criterion for specialists' readiness for inclusion implementation in education. *Information Technologies and Learning Tools*, 72, 273-285. <https://doi.org/10.33407/itlt.v72i4.2561>
- Sikorska, I. M. (2011). Volodymyr Danylovych Zubytskyi. In I. M. Dzyuba, A. I. Zhukovsky, M. G. Zheleznyak ... and I. S. Yatskiv (Eds.), *Encyclopedia of Modern Ukraine*. Institute of Encyclopedic Research of the National Academy of Sciences of Ukraine. <https://esu.com.ua/article-13946>
- Smith, M. B., & Schwartz, S. H. (1997). Values. In J. W. Berry, M. H. Segall, C. Kagitcibasi (eds.) *Handbook of CrossCultural Psychology, Volume 3* (pp. 77-118). Allyn & Bacon. https://www.researchgate.net/publication/289252331_Values

- Vasilyeva, E.G., & Kononenko, D.V. (2016). Sovremennyye interpretatsii kontseptsii elektronogo gosudarstva (elektronogo pravitel'stva) [Current interpretations of the concept of electronic state (e-government)]. *Bulletin of Volgograd State University. Series 5: Jurisprudence*, 1(30). 9-16.
<https://j.volsu.com/index.php/ru/component/attachments/download/1261>
- Vdovych, S. M. (2013). *Suchasni osvichni tekhnolohiyi movnoyi pidbotovky maybutnikh fakhivtsiv sfery obsluhovuvannya* [Current educational technologies of language training of future specialists in the field of services]: a methodical guide. Pedagogichna Dumka.
https://lib.iitta.gov.ua/4599/1/Vdovych_Palka_2013.pdf
- Vuckovic, T. (2019). The Overall Goal of Education and General Purpose. *International Journal For Empirical Education and Research*, 3(20), 53-66.
https://journals.seagullpublications.com/ijeer/assets/paper/IJ0620191784/f_IJ0620191784.pdf