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The Terms Framework Formation for E-Learning in Pedagogical Science and Practice

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Abstract: The article discusses the concept of 'e-learning' from the point of logical and semantic analysis. The formation of the 'e-learning' concept in the context of information development and communication technologies and their implementation in the educational process is analyzed. The ambiguity of understanding the meaning of 'e-learning' and 'distance learning' terms are established, the relationship of electronic, computer, distance, mobile, mixed, online learning concepts is revealed. Among the meaningful features of the e-learning concept, there are semantic, logical, technological, and didactic aspects. The author concludes that the content of this concept is poorly developed at the didactic level, which leads to the risk of reducing the quality of teaching, 'blurring' the effect of e-learning in pedagogical practice. It is proposed to consider the formation of the concept of 'e-learning' as a separate new didactic category.

Keywords: e-learning, distance learning, online learning, logic-semantic analysis.

INTRODUCTION

The expansion of technological capabilities has contributed to the active use of e-learning technologies in education in various didactic models. The combination of full-time training and distance support, the development of online learning raised several questions for modern didactics that cannot be resolved without a clear definition of the very concept of 'e-learning'. The relevance of the study is determined by the need to substantiate the phenomenon of e-learning as a new direction of didactics in the context of the post-industrial paradigm of education, conditioned by the formation of the theory and methodology of education informatization. At the moment, e-learning technologies require a deep scientific and pedagogical analysis against the background of new challenges of the 21st century economy (i.e. the need for constant innovative development; the fusion of technologies and the blurring of boundaries between the digital, production and biological spheres and aggravation of competition at the geo-economic level). Researchers also identify some risks of a humanitarian plan (i.e. technical-machine dependence of a person, replacing reality with its surrogate virtual model and dehumanizing relations), decreasing the quality of education (one-sidedness and limited pedagogical practice of using e-learning technologies). These contradictions between practice and theory of the modern educational process based on e-learning technologies are natural, since this direction of pedagogical science is at the stage of its development. At this stage of the development of scientific and pedagogical knowledge in the field of educational informatization didactics, there is a polysemy of the terminological apparatus. The ambiguity of the term 'e-learning', the presence of its derivatives or too broad semantic content at the present stage becomes a certain obstacle to the implementation of the educational process. The study attempts to achieve the highest possible accuracy in defining the permissible meanings and meanings of the concept of 'e-learning', especially in the context of specific research and scientific works. The undertaken terminological analysis involves, first of all, identifying the meanings and meanings of the terms that make up the concept, and then its general semantic characteristics and justification of the definition and the construction of the definition.

The Genesis of E-Learning Terminology

The concept of 'e-learning' (English e-learning) entered every day and scientific use relatively recently (the end of the 60s of the 20th century) in connection with the rapid scientific and technological progress. The complexity of identifying the essential characteristics of this concept is associated with the variety of interpretations of the term 'e-learning'. Moreover, the reason for the ambiguous scientific understanding of this concept lies in the fact that this term is used not only in scientific, but also in natural speech. At the same time, the accumulation of facts, ahead of the development of scientific analysis of this phenomenon in pedagogical science, has led to the growth of predominantly empirical research.

In most of these works, e-learning is seen as: synonymous with distance learning; technological process (platform) for the interaction of subjects of the educational process; a new form of organization of training or a method of using informatization means in the educational process. The context of scientific research devoted to the problem of e-learning is mainly focused on describing one of the essential characteristics of this concept -

'providing access to educational content and interaction using various electronic devices and telecommunications'. Here are some examples of e-learning definitions that fit this characteristic.

The European Commission's definition of e-learning is 'the use of new multimedia and Internet technologies to improve the quality of learning by improving access to resources and services, as well as remote knowledge sharing and collaboration' (Resta, 2005).

Federal Law 'Education in the Russian Federation' (Federal Law No. 273), article (No. 16) 'e-learning is understood as the organization of educational activities using information contained in databases and used in the implementation of educational programs and information technologies, technical means that ensure its processing, as well as information and telecommunication networks that ensure the transmission of the specified information through communication lines, the interaction of students and teachers'.

The Concept of Informatization of the Education System of the Republic of Belarus for the Period until 2020 (2013) 'E-learning is an approach to the development and self-realization of learners of the use of multimedia technologies and the Internet to improve the quality of education by facilitating access to resources and services, as well as to remote information exchange and interaction'.

Western researchers have also looked at e-learning in this context. E-learning (Hirumi, 2002) has been defined as a learning activity that is carried out primarily through the use of telecommunication technologies such as e-mail, bulletin board systems, chat rooms, video conferencing and the Internet.

E-learning is seen as using the Internet to access learning materials; interaction with content, instructor and other learners; receiving support in the learning process, for mastering knowledge, forming a learning experience (Anderson, 2008).

E-learning is also defined as the use of computer and Internet technologies to provide a wide range of solutions to ensure the educational process and increase its productivity (Ghirardini, 2011).

As can be seen from the examples presented, this phenomenon appears to be much broader and more voluminous than only as a process of 'delivery' of information and interaction, and as a consequence it is an intensification of education (based on the speed of information transmission, expansion of the channels for its receipt). In addition to the use of various telecommunication means for access, the organization of training, and communication with the teacher to receive support, and the formation of individual experience (development trajectories) are mentioned.

Also, the difficulty in defining the content of the concept of 'e-learning' is because it is quite often used as a synonym for such concepts as 'distance learning', 'online learning' in both English and Russian-language sources.

Semantic Analysis of the Terms 'E-Learning', 'Distance Learning' and 'Online Learning'

Using several online services (Google search engine, Google Academy Library, Google Ngram Viewer, Google Trends), the study carried out a semantic study of the terms 'e-learning', 'distance learning', 'online learning', as well as their equivalents in English languages 'e-learning', 'distance learning', 'online learning'.

The choice of these systems was primarily due to the popularity of the Google search engine in the world, which, according to 2018, occupied 92.46% of the global search engine market share (Browser Market Share Worldwide, 2019). The online library of full-text scientific publications 'Google Academy' includes data from the majority of peer-reviewed online journals of the largest scientific publishing houses in Europe, America, and the CIS.

The online service Google Ngram Viewer allows you to determine the frequency of use of certain words and phrases based on the analysis of electronic copies of printed sources posted on the Google Books service. Searches include arrays of American English, British English, French, German, Spanish, Italian, Russian, Hebrew, and Simplified Chinese.

Here are the results of the analysis of the established practice of using these terms.

The online service Google Trends shows the frequency of searches for a specific term concerning the total volume of searches in different regions of the world and different languages. Based on the results of the analysis, the system builds a graph on which the specified period is displayed on the horizontal axis, and on the vertical axis it is the frequency of search for a term with the total number of search queries worldwide. The service allows you to show the distribution of the popularity of the term by region, city and language. The ranking of the number of search results allowed us to draw the following conclusions:

There are several popular phrases on the Russian-language based Internet the so called 'distance learning', 'online learning' and 'e-learning' (Table 1).

- There are several popular phrases on the Russian-language based Internet the so called 'distance learning', 'online learning' and 'e-learning' (Table 1);

Table 1: Analysis of search queries for 'distance learning', 'online learning' and 'e-learning' in Russian

Search results (22.04.2019)	Google search engine (number of searches)	Rank	Google Academy Library (Number of Searches)
Distance learning	4.110.000	1	29.700
Online learning	1.750.000	2	20.500
e-learning	1.170.000	3	12.000

Among the English terms, the most popular (in descending order) is 'e-learning', then 'online learning' and then 'distance learning'. However, search results for these terms in the Google Academy Library showed that their ranking in scientific articles was distributed slightly differently. After 'e-learning', 'distance learning' is in second place, followed by 'online learning' (Table 2).

Table 2: Analysis of search queries for 'distance learning', 'online learning' and 'e-learning' in English

Search results (22.04.2019)	Google search engine (number of searches)	Rank	Google Academy Library (Number of Searches)
e-learning	118.000.000	1	689.000
Online learning	62.700.000	2	460.000
Distance learning	20.500.000	3	517.000

It should be noted that the term 'e-learning' is currently used not only in English-language literature, but also in Russian articles, which is a consequence of their direct borrowing. For the computer Russian language, this is a fairly typical phenomenon noted by researchers in the field of computational linguo-didactics (Orekhov, Reznikova, 2015). According to Polovets (2016), computational linguo-didactics, which originated in the 80s of the twentieth century, as a new area of knowledge, is also in its infancy, and the terminology of this area is an open, intensively developing, emerging and unstable system.

The conducted research shows that in the development of the Russian terminological system 'Computer' the leading role is played by English borrowings (Goldberg, 2011). This, to some extent, explains the different approaches to formulating the content of concepts denoted by these terms in Russian.

Here are the results of a study of the frequency of mention of the terms 'distance learning', 'online learning', 'e-learning' and their English-language sources, which were recorded in books from 1950 to 2008, carried out using the online service Google Ngram Viewer (Figure 1). In modern computational linguistics, these phrases are called bigrams and are an important statistical tool (Orekhov, Reznikova, 2015).

Fig.1: Frequency of 'distance learning', 'online learning' and 'e-learning' terms reference

In Figure 1, you can see that the use of the phrase 'distance learning' in Russian started to grow in the early 1970s, 'e-learning' in the early 1980s. Use of the phrase 'distance learning' peaked in 2003 and has been steadily declining since then.

The use of the phrase 'e-learning' is growing steadily, but it is much less common than 'distance learning'. The relative frequency (expressed as a percentage) of the occurrence of the given bigrams in 2008 was 'e-learning' - 0.0000026030%, 'distance learning' 0.0000211590%.

The term ‘online learning’ was not noted by the system as meaningful for counting. This situation is primarily due to the fact that the Google Ngram Viewer system itself presents data on books up to 2008, and the development of online learning as a new phenomenon began later than this period.
Figure 2 shows the usage frequency of ‘e-learning’, ‘online learning’ and ‘distance learning’.

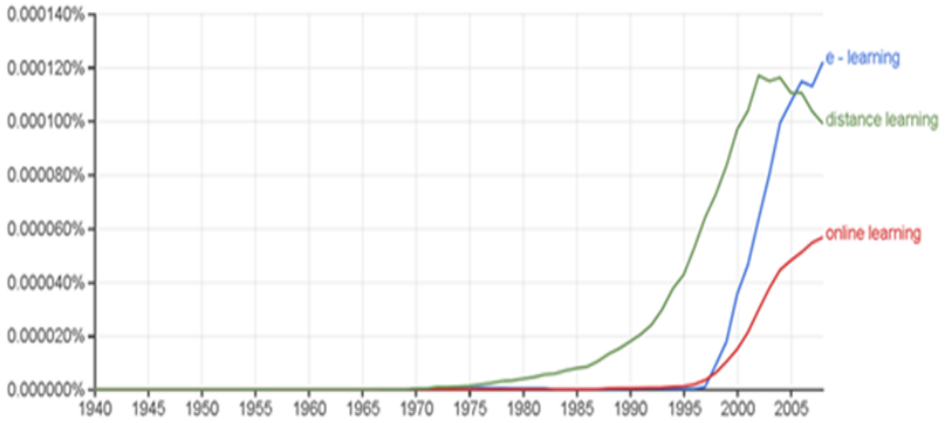


Fig.2: The usage frequency of ‘e-learning’, ‘online learning’, and ‘distance learning’ in English

The ‘distance learning’ phrase was the first to appear in books in English since 1950, followed by ‘e-learning’ (since 1960) and ‘online learning’ (since 1970).
The tendency to use these terms in English is distributed as follows: the most popular term is ‘e-learning’, hereinafter ‘distance learning’, and so far the term ‘online learning’ is the least represented.
The relative frequency of given bigrams occurrence in 2008 was (top-down): ‘e-learning’ – 0.0001220314%, ‘distance learning’ – 0.0000989637%, and ‘online learning’ – 0.0000566873%, ‘distance learning’ – 0.000021159%, ‘e-learning’ – 0.000002603%, ‘online learning’- 0 (Figure 3).

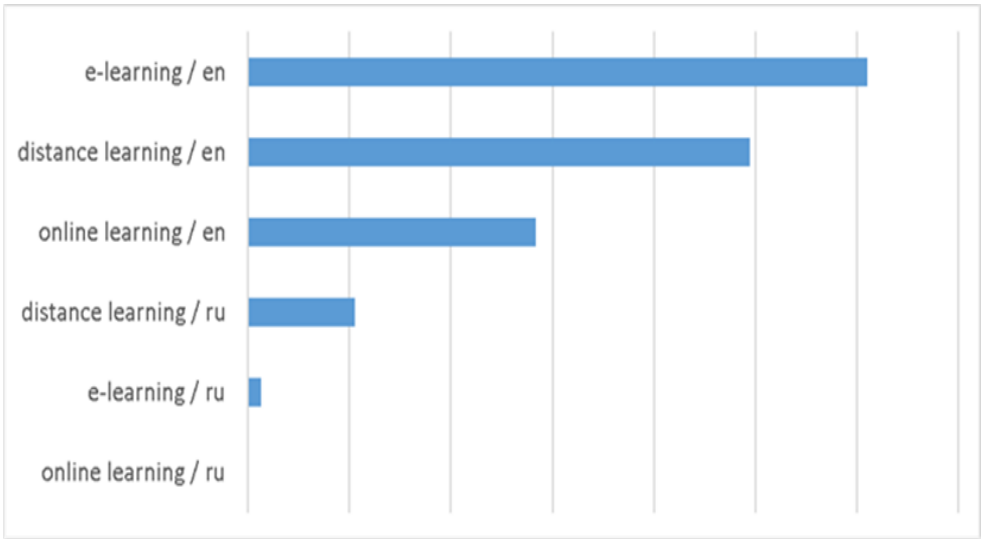


Fig.3: The relative frequency of given bigrams occurrence

Summing up the work with bigrams, we can conclude that the terms ‘e-learning’, ‘distance learning’, being borrowed from the English language, have not yet received an unambiguous interpretation of the content of the designated concepts, since the words of our everyday language and the concepts expressed by them turn out to be inaccurate, unclear, ambiguous. You should also take into account different cases of their use and inaccuracy when translating from a foreign language. An important fact is that the number of scientific texts in English as a whole in the world and on the topic of this study significantly exceeds the number of publications in Russian, which also causes the desire of some authors to resort to simple tracing of these concepts. As a result of incorrect translation, the use of the term ‘e-learning’ out of context led to the manipulation of its analogue in Russian, this is ‘e-learning’.
Some researchers make obvious logical errors in defining these concepts. For example, ‘e-learning’ (EL) is an extension of ‘distance learning’ today. EL is a broader concept that means different forms and methods of education based on information and communication technologies (ICT) (Slavinskaya, 2014). In this case, ‘extension of the term’ and ‘broader concept’ are not adjacent phrases in meaning. So, according to the word of

linguistic terms, 'the expansion of the meaning is the increase in the semantic volume of the word in the percentage of historical development, Pope. That is, 'distance learning' includes e-learning, based on the first sentence quoted above. However, the second sentence refutes the first, since a broader concept, according to the rules of concept relations, includes a narrower one.

Also, when defining the term 'e-learning' in pedagogical science, there are discussions about the formation of such concepts as 'electronic didactics', 'e-pedagogy', considered in the context of the term 'e-learning'.

This state of the terminological base of informatization of education is due to several reasons:

- The short duration of the formation of scientific and theoretical knowledge in this area (about 50 years);
- Rapid change of technologies (ICT means) for the implementation of pedagogical interaction and learning, which does not allow assessing their pedagogical significance;
- Relying on different aspects of the concept content of 'learning' (i.e. process, activity, system, technology and form (or path) of obtaining education) while forming 'e-learning' and 'distance learning' from it.

In this regard, the consideration of correspondent, distance learning as prototypes of distance learning is based on only one common feature 'learning' as a form (path) of education, in particular at a distance. At the same time, researchers (Slavinskaya, 2014; Nikitina, 1999; Mozhaeva, Reingold, 1998; Ilyin, 2001; Vashakidze, Filippova, 2005; Shchukin, 2015) see the difference between distance and distance learning in adding new opportunities (mainly the Internet) for the implementation of pedagogical interaction with students.

Logical Structuring of 'E-Learning', 'Distance Learning' and 'Online Learning' Concepts

Another meaningful concept feature of 'e-learning' and 'distance learning' should be the technological aspect, which is understood as the expansion of learning tools based on ICT. The meaning of the concept of 'manufacturability' is to make the educational process completely manageable. This term became widespread in pedagogical literature in the second half of the twentieth century in connection with the development of programmed teaching (Azimov, Shchukin, 2009).

According to Robert (2016), in the theory of informatization of education, it has been convincingly proved that when teaching on the basis of ICT, in general, there are: a three-component composition of information interaction between students, teaching and an interactive source of educational information; new types of educational activities; new types of electronic educational material (i.e. hypertext, hypermedia and interactive); new ways of managing educational activities based on information and analytical systems.

Also, researchers consider the concept of 'e-learning'. In particular, Avanesova (2013) refers to e-learning 'only those learning processes and technologies in which the computer simulates and implements at least one function of the teacher to manage the learning activity of the learner'. Singling out a computer from the number of all other means of information and communication technologies, the author concludes that all e-learning technologies should be designated by the term 'computer learning technologies'. However, the concepts of 'electronic' and 'computer' differ significantly in their scope:

computer: 'adj. 1.rel. with noun a computer associated with it; 2. Characteristic of a computer, characteristic of it. 3. Computer-owned. 4. Executed on a computer' (Efremova, 2000);

electronic: 'based on electronic technology. 1. This term is intended to encompass any or all devices or systems that operate on electricity. 2. Electrical / electronic / programmable electronic devices include: electromechanical devices (electrical); semiconductor non-programmable electronic devices (electronics); electronic devices based on computer technology (programmable electronic) '(Technical translator's guide, 2009-2019); 'Designed on the basis of electronics… Implemented through the global computer network, existing in the global computer network; network' (Efremova, 2000).

remote: '2. adj. 1) Corresponding by value. with noun: distance (1), associated with it ... 3) Produced, acting at a distance' (Efremova, 2000).

As you can see from the above definitions, the concept of 'electronic' is much broader than 'computer' and includes it in its scope, while the concept of 'remote' is in relation to externality, since their volumes completely exclude each other (Figure 4):

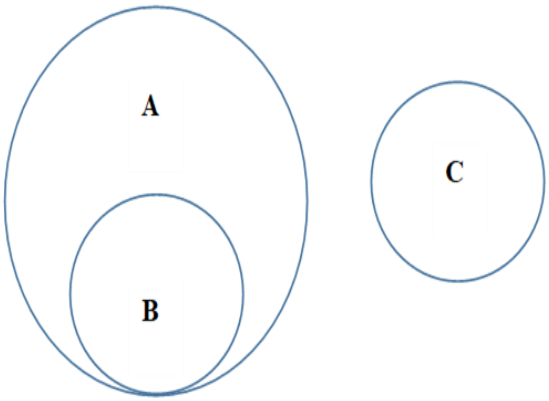
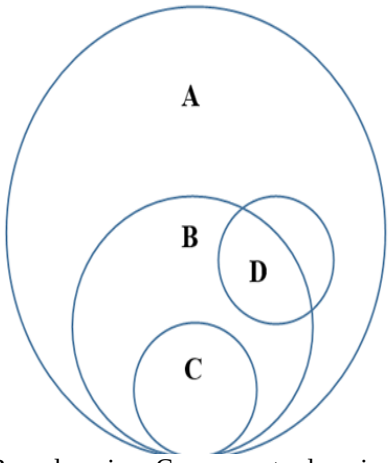


Fig.4: Relationship of concepts electronic, computer, remote

However, if the scope of 'electronic' and 'remote' concepts do not contain any common object, the scope of 'e-learning' and 'distance learning' concepts are in the relation of intersection (Figure 5).



A – learning; B – e-learning; C – computer learning; D – distance learning

Fig.5: Relationship concepts of learning, e-learning, computer learning, distance learning

At the same time, in the studies of various years, there is a clearly noticeable tendency towards understanding distance learning mainly as remote (part-time, part-time) learning based on the use of various electronic means (ICT, telecommunications, computer technology, etc.).

Here are some examples from the point of view of the shift in the semantic content of the concept of 'distance learning' as being more and more fully included in the concept of 'e-learning' (that is, learning based on ICT) in chronological order:

1. '…' Distance learning' is now used alongside the new term 'e-learning'. E-learning is a broader concept that means different forms and methods of learning based on information and communication technologies (Afanasyeva, 2001).
2. 'Many educational institutions, considering their prospects, plan to develop distance educational services based on e-learning technologies' ([12], 2007).
3. 'The concept of e-learning is closely related to the field of distance education ... However, e-learning and distance learning are not reducible to each other, because e-learning can take place within the walls of the university, and distance learning can do without computers (telephone, mail, audio recordings)' ([13], 2009).
4. The term 'distance learning' has become synonymous with 'e-learning' or 'online learning', meaning, in fact, not only learning over the Internet ([14], 2010).
5. 'Distance Learning and e-Learning have common points of intersection, but still they are not synonyms ... E-Learning is a 'direct descendant of computer-assisted learning technologies' and its purpose ... was ... to use new technologies to improve efficiency education. E-learning does not mean purely distance education' ([14], 2012).
6. 'Without a doubt, distance learning technologies without e-learning are dying out…' (Russian Internet Forum, 2017).

As you can see from the examples above, the terms e-learning, distance learning, e-learning, and online learning are often used interchangeably. Often, 'e-learning' refers to both e-learning and distance learning. However, as the analysis of studies and the conducted semantic analysis have shown, most likely in a few years the meaning of the meanings of these concepts will merge.
The dynamics of search queries over the past five years (Google Trends, 2019) shows a steady interest in all the terms 'e-learning', 'distance learning', 'online learning', 'MOOC' (Figure 6).

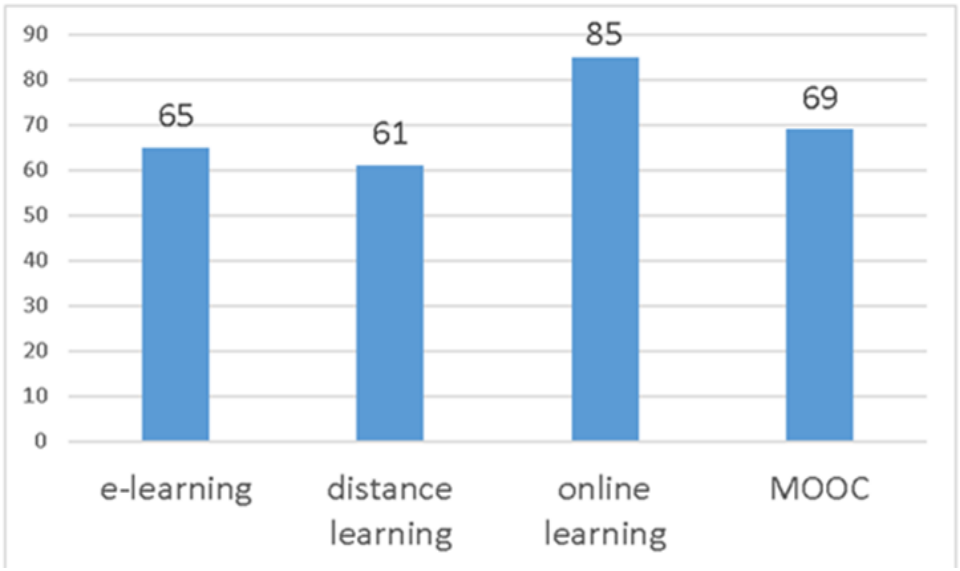


Fig.6: Dynamics of search queries for specified terms

The Term 'E-Learning' as an Unsettled, Ever-Expanding Scientific Concept
Based on the logical-semantic analysis of the concept of 'e-learning' and close to it 'distance learning' and 'online learning', it can be concluded that the concept of 'e-learning' is the most general concerning the rest.
In the course of 'e-learning' concept evolution, the initial essential characteristics were formulated based on instrumental and technological functions, this is a means of delivering educational content and interaction using various electronic devices and telecommunications.
In line with these characteristics, in the last 30 years, several concepts have emerged that have appeared in foreign and Russian-language research such as an electronic, computer, distance (e-learning), mobile (m-learning), u-learning, blended learning (blended learning).
These concepts are specific about the concept of 'electronic learning' in terms of performing functions by various means of accessing educational information and organizing forms of interaction.
In this context, e-learning, as a generalizing concept, refers to the **learning process** using various software and hardware tools and telecommunications.

Depending on the leading type of computer device and the method of transferring information when organizing pedagogical interaction, several main types of e-learning can be distinguished:

- Computer learning is guided learning and self-learning with the predominant use of computers (stationary) and certain educational software;
- Distance learning is guided learning and self-learning in a remote mode using software and hardware and telecommunications to access educational content;
- Mobile learning is guided interactive learning and self-learning anytime, anywhere using personal portable computing devices (Minich, 2013);
- Online training is training organized based on synchronous telecommunications and online services (or platforms). It should be noted that the above list will not be final due to constant technological progress and the development of new technologies and digital devices.

However, understanding e-learning only as a tool leads to the perception of education as 'education is support for development on the life cycle, that is, a human-robot to support technological progress. When moving in this direction, a new generation will likely be formed by 2030, i.e. the 'new Mowgli' is a generation of children learned from tablets, a generation with an unstable value system that grew up in gaming environments, according to Future education: a global agenda (Russian information guard, 2016).
Among the students, i.e. direct participants in modern educational processes, the meaning of e-learning is also still limited by the presence or absence of any electronic device in the lesson. According to the results of a pilot study among students of Belarusian State Pedagogical University and students of general secondary education

institutions in Minsk in 2016, it was found that, in general, under the term ‘e-learning’ they mean a lesson that uses computer technologies, the Internet, and multimedia. In this lesson, you have the opportunity to receive information anytime, anywhere. According to the respondents, e-learning should include media technologies, receiving assignments in electronic form, and conducting webinars. The respondents considered network lessons, distance learning, and online courses the least preferred, which is due to the lack of experience of participation in such forms among students before entering the university.

In general, the modern generation of students, especially those between the ages of 12 and 25, are confident that learning of the future is learning through the Internet. According to the survey results, the Internet, network communications, and communities have become firmly established in the system of personal values of modern students. Thus, 95% of respondents constantly (78%) and several times a day (18%) use the Internet. At the same time, the purpose of using the Internet is mainly of an entertainment and informational, rather than educational nature, according to Minich (2016).

Consideration the ‘e-learning’ concept applying the logical-semantic analysis, the following conclusions can be drawn:

- Researchers from different countries differentiate the meaning of the terms ‘e-learning’ and ‘distance learning’ not unambiguously;
- At the level of natural usage, e-learning is understood as training, in the implementation of which any electronic devices are used, mainly in combination with telecommunications;
- The scope of the ‘e-learning’ concept is much broader and includes the following concepts: computer, distance, mobile, blended, online learning;
- At the level of teaching theory (or didactics), this concept is poorly developed, which leads to the risk of a decrease in the quality of teaching, ‘blurring’ of the effect obtained from e-learning in pedagogical practice.

In this regard, it seems appropriate to consider the formation of this concept as a separate new didactic category.

CONCLUSION

For any science, the problems of forming a conceptual and terminological apparatus are methodologically complex and at the same time relevant. The terminological apparatus of pedagogy as a humanitarian branch of scientific knowledge is closely related to the change in socio-historical, economic and cultural conditions. Quantitative and qualitative changes in the composition of the conceptual and terminological apparatus of pedagogy were recorded by researchers at the turn of the 20th and 21st centuries, including in connection with the emergence of a new direction in didactics - informatization of education Informatization of modern society necessitated the widespread use of information technologies in education. Computer technology began to act as a powerful teaching tool, therefore, a radical reform of the teaching process is associated with the introduction of new teaching tools and methods. Studying the works of researchers in the field of e-learning allows us to fix the gap between the practice of e-learning and the level of its reflection in didactic knowledge at the conceptual and terminological level. Starting from the semantic meaning of the concept ‘learning’, as generic to the concept ‘e-learning’, one can imagine its content as a process (a set of sequential actions to achieve an educational result); activity (joint, ensuring the formation of knowledge, skills, competencies); technology (building an educational process with predetermined results); system (management of information interaction) and which is carried out in the electronic information and educational environment, the composition and structure of which also depends on educational goals and objectives.

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