

The Concept Of Electronic Learning With The Application Of Digital Technologies

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Abstract

In the article there is considered the topic of electronic education as the form of contemporary subject teaching, the characteristic quality of education which has the principle meaning. However, despite the fact that a lot of pedagogical researches are devoted to this kind of education, its definition as a concept and its description as a phenomenon are rather ambiguous. That's why it is necessary to give the definition to its concept, conceptual signs which all together define its conceptual model. In the basis of electronic education there is the digital presentation of information and information technologies. Therefore its consideration is done in the context of digitalization and application of these technologies. There is drawn the conclusion defining all further description and the concept formed in its frames that the universal form of education is the balanced combination of electronic and traditional (based on textbooks) forms with prevailing of one of them in certain systems in accordance with their specific features. Ten conceptual principles of electronic education showing its main structure, problems, means and components defining qualities of media and electronic education are formulated.

Keywords: electronic education, digitalization, resource, technology, concept, socioculture, competency.

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1 Introduction

Problems of electronic education are considered in the combination of the objective and the subjective. The objective is the essence of digitalization, electronic-digital presentation of information, media-information, electronic educational resources, cyber systems; information and communication technologies, media- and smart-means; cyberspace. The subjective is the subjects of education with the inherent emotions, psyche for which appropriate knowledge, competencies and culture are necessary.

2 Problem statement

Electronic digital presentation of information and information processes have been for a long time an inseparable part of the society life and consequently of education. That's why the development of electronic education is the most important problem of pedagogy, education, subject systems and techniques. However meanwhile a larger certainty of this kind of education as a concept and a phenomenon is necessary and, first, its concept – a conceptual model with lots of essential (defining) conceptual signs and their description which can be the basis for the creation of the logic-semantic model of electronic education with the usage of digital technologies. This article is devoted to these problems.

3 The development of the technique

3.1 Aims of the research

The aims of the research are:

- Identification and substantiation of electronic education and digitalization as concepts and phenomena of contemporary education.
- Defining of conceptual signs of electronic education in the context of its structural and content description and substantiation of their relevance.
- Description of communication environment of electronic education, media environment and cyberspace in logical interrelation with it.
- Defining of necessary qualities of electronic education subject – knowledge, competencies, culture. [Bru93].

3.2 Methods of research

Main methodological approaches used in this paper are: Content approach, aimed at the adequate expression of the electronic education content and digitalization. Formal approach, aimed at the definition of optimal formal and logic means, resources and technologies of electronic education. Sociocultural approach, aimed at the development of socioculture, personal informational culture by means and resources of electronic-digital education, and the culture of interaction in its environment.

3.3 Methods of research

Methods of research implementing these approaches are methods of systematization, formalization, modeling, expression of socioculture phenomena.

4. Content and results

Electronic education is the form of contemporary education and subject teaching. It is the level of education reached in the information society. It is the demand of information-communication environment expressing conditions, results and tendencies of its development. It is the face of the contemporary society and its scientific-cognitive sphere, the main indicator of its state, development of its knowledge and technologies, the pledge of this development. However it does not the transfer of ready forms and means into educational space, its implementation and usage with some adaptation to certain conditions, and the following things are necessary:

- a special pedagogical theory and appropriate systematized knowledge,
- statement and solution of conceptual problems, necessary methodological substantiation,
- their implementation in pedagogical technologies and subject scientific-technique systems,

- defining of electronic education strategy and implementation of digital technologies, information presentation, resources,
- defining of ways and techniques of solution of tactic tasks, implementing general (universal) pedagogical technologies, appropriate knowledge and regulations of subject scientific technique systems.

Alongside this, the identification of electronic education as a universal form of education, its basic characteristic sign does not mean the rejection of traditional forms which are studied well enough and have wide application and which have proved their efficiency during a multi-century practice. A new quality gained by education in the course of its development together with the development of the society doesn't substitute "the old" mechanically, but should "coexist" with it in the systematically stipulated unity. We agree with the opinion of John Bruner that the methods and means of Informatics should be applied in education [Bru96], that is, the basic provisions of Informatics in principle should be applicable to the organization of the learning process. They should help a person to understand the laws of thinking better and teach people to use them more effectively [Bru93], [Cit88], [Chi85]. There must not be any antagonism, but there must be constructive and therefore productive interaction.

The concept of electronic education as the defining quality, the quality of education must envisage not the displacing of traditional forms of education but their reconciliation, the development of the education strategy on the basis of their productive interaction, allowing the prevalence of one of the forms at the tactic level taking into account age and psychological peculiarities of students, certain conditions and tasks of subject teaching. It corresponds to the following statement: "electronic education ... has transformed from the category of technologies to the category of a new educational paradigm. Electronic education demands the creation and usage of electronic information education environment in the process of education, with the help of which the interaction with the teacher will be implemented" [Fok15], according to which electronic education naturally penetrate into the "usual" one.

This combination in its dialectical unity of different forms is one the conceptual signs, the sign of dialectical unity of contemporary education, subject teaching and, in particular, electronic education.

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As the form of electronic education has dialectical necessity, so there are required also its other conceptual signs, identifying its qualitative signs as independent and perspective form of education. It means that identification of individual qualitative signs of electronic education as the phenomenon of information education environment in the developing information society is necessary.

In spite of merits of electronic education in the situation of its alternativeness absence, it hides certain danger of the loss of personal information security by students. The departure from the diversity of a live real world to the diversity of the abstract world, closing in it, leads to impoverishment of the man as a personality, to the formalization of reality assessment and technologization of his thinking. Getting from the usual three-dimensional space of the real world into the multi-dimensional space of the virtual world, the students can "get lost" there, can become its prisoner, often without understanding it. That's why "departure" of the man to the virtual world is dangerous both for him and for the society. "Any virtualization substituting natural, culturally substantiated detectors of micro- and self-perception, as a result take the man out of the reality context", [Shu13]. Moreover, information and consequently any element of cyberspace "read" by the man become his possession which he can use physically as he wishes. But there are ethic and moral norms, regulations of copyright and any other information license, usage culture, references, etc. It is necessary to add that there are demands for personal security and information security, environment security. That's why the man should have not only knowledge and skills for effective safe and lawful interaction with the cyber space [Abd16], but also cognitive culture, culture of relations with the cyber space, media culture [Abd(2)16]. It supposes the need for another qualitative conceptual sign of electronic education:

Presence of dialectical unity of electronic and traditional (paper-oriented) forms of education requires both their differentiation and integration that is their consideration in a differentiated unity.

Integration of electronic and traditional forms of education supposes their natural conditioning, necessity of its definition and usage, application of mechanisms of their interconnection and productive interaction with the aim of both heightening of educational processes and their rationality.

Differentiation of electronic and traditional forms of education supposes not only systematic description of peculiarities, advantages and possible faults of suggested forms of education but also personal knowledge of them, reliance on them, the skill of making the right choice in accordance with the aims and tasks of education, to apply them correctly and productively not forgetting about personal informational security.

In contemporary sphere of education there is envisaged the transition from learning to self-learning, from

education to self-education, from comprehension to self-comprehension, from development to self-development, formation of person's ability for self-learning, self-comprehension, self-development. Therefore it is necessary to develop possibilities to use electronic and other forms of education with the aspect of their paradigm differentiation and integration considered as mutually conditioned parts of the unity. Electronic education supposes the existence of the combination of direct and indirect connection and as a consequence the student's ability for constructive implementation of these connections adequately and enough.

There should be present appropriate subject, intersubject and informational competence of subjects of education, growing into the personal culture of knowledge and cognition, information culture including the culture of information security.

Thus the next conceptual sign, the sign of differential integration, of electronic education is the ability of any system of education and each subject of education for differentiation and integration of different forms of education (electronic and traditional) in concern with educational effectiveness and information security.

The characteristic feature, peculiarity of electronic education is digitalization – digital presentation of information in computer memory and in the data storage device. Electronic-digital presentation of information means the only form of its implementation – binary or bit with two possible meanings: 0/1.

The meanings 0 and 1 correspond to the logical meanings of binary logics, meanings of “Lie” and “Truth” that allows creating presentations of information compatible with logic conclusions. Binary logics expresses logic-analytical thinking of the man and lies if the basis of the logic conclusion and intellectual computer systems.

Digital identification of the bit meaning allows its interpretation as binary number in the form of the ordered sequence of zeros and ones. Bits unite into bites, words, underwords, appearing in different number forms (binary, hexadecimal, decimal) which give the opportunity for the better perception, effective processing and communication of information.

The numeric form of information permits making its mathematical processing in accordance with specialized computer programmes and technologies. At the beginning of the contemporary electronic-digital era the computer was understood as “the calculator” that corresponds to its name. Nowadays “the computer” is not more than the abstract concept meaning a highly developed intellectual system created by the man. Formally digitalization supposes first of all the calculation, numeric processing of information that also doesn't correspond to modern reality. Essentially contemporary digital technology is a bit-digital expression of electronic intellectual system, digital technology of education is a specialized electronic intellectual system intended for training taking into account its aims and peculiarities.

With the development of informatization the possibilities of electronic intellectual systems including teaching systems, specialized digital technologies, electronic stimulators increase, in their application they allow “increasing speed of manipulations and making decisions, reducing time of education, more adequately assessing the level of gained knowledge and skills, individualizing education, forming conclusions concerning actions of students”, [Wex16].

Along with this there increase the requirements to subjects of electronic education, students and teachers, their competence, knowledge and culture, content and organization of their activity, interactivity. The demands increase to systems of education themselves (subject and intersubject), to educations on the whole.

Thus digital presentation of information has the logic unity with processes and data processing at the level of the operational system which is also presented in the binary-digital form. That's why the conceptual sign of electronic education, the sign of knowledge and metaknowledge in digitalization, is the knowledge of the essence of the binary-digital expression of information and presentation of its expressing processes, possessing appropriate informational competence. Certain metaknowledge and knowledge about electronic education itself in connection with its nature (physical and logical) and the structure are necessary.

The next peculiarity of electronic education is considerable expansion of communication. Communication is always present in education and subject teaching and is its basis. This first of all is communication interaction of education subjects, teachers and students, students with other students, teachers with other teachers. Besides, giving-gaining knowledge in any system of education is the information process with their communication. The work with the textbook is also communication of information: reading, perception, absorption, gaining. However the textbook is a static member of communication, its content is stationary both quantitatively and qualitatively, and the perception of its information depends only on the studying object itself.

Electronic education supposes diversity of kinds and processes of information communication conducted by means and technologies of information environment, informatization of the society and education. If communication environment of the work with the textbook is limited by it and means “at hand”, communication environment of electronic interaction is unlimited: any information is available along plenty of communication

channels and lines – network, internetwork, global, local and distant. It comes to the subject of communication interaction – you should only formulate information-educational request correctly.

In contrast with the static textbook which is only the mediator in the relations between the teacher and the students, communication environment is characterized as dynamic and itself is an active participant of electronic education. It leads the subject along its information highways, points to possible ways and directions. That is, the relations of the educational environment of electronic education and students become independent, and the student gets comparatively more independence which implies on the one hand more motivation, on the other hand – more responsibility.

Along with this the width of training-communication space and availability of information may have a certain dangerous aspect: one “may not find a forest in the forest”: may not find necessary topic information, may not find what is necessary (useless for education), or may find the thing which is harmful for the personal development of the subject of education. “The virtual space structure itself leads the man quite in a different direction, contrasting his initial intention. The Internet space may be compared with the jungles covering the whole planet surface”, [Sha13].

That’s why the system of electronic education must have clear topical settings for search and consumption of training-cognitive information by students, orderly structure of electronic education environment, provision of necessary motivation for purposeful cognition, possessing of information-communication competence by all subjects of education and developing of personal culture of interaction with training environment

Thus one of the conceptual signs, the sign of communication development of education, is on the one hand the increasing importance and considerable expansion of its communication environment, on the other hand, the demand of readiness of education and subject teaching systems for constructive, productive and safe learning-cognitive interaction with it:

- readiness of educational systems – organizational, methodological and methodical, technological (at the level of pedagogical and information-communication technologies);

- readiness of subjects of education – motivational, psychological, competent, sociocultural.

On the one hand electronic education gives new, additional opportunities for the personal development. On the other hand, while demanding preparedness for it from its subjects, it supposes presence of certain preparedness for fruitful interaction with educational-communication environment, formed during “usual” education. Communication component of education presupposes “active interaction of the subject of education with information environment, information education environment (IEE), work with information resources, their search, reproduction, application. Modern information-educational means and resources become mainly electronic, multimedia, have presentation in the form of the hypertext, gain the signs of the cybersystem. Meanwhile the subject must possess not only the information-communication competence growing in volume and quality but also a social-legal one which means knowledge and observance of corresponding social and information-legal rules” [Abd18].

Consequently, here there is an important age factor influencing on the personal development and its state, and there is displayed the importance of the balanced combination of forms of electronic and traditional education. Besides, preparedness of subjects of education for such interaction is referred to all its participants, both to students and teachers doing control, correction, assessment and consequently having not only a professional, but an adequate information-communication competence. The subject of electronic, as any other, education must possess the following abilities:

- for qualitative estimation of coming information, defining its usefulness for its cognition, personal development and, in particular, for achieving presupposed aims and tasks of education;

- for preventing of negative influence of poor unreliable information or disinformation;

- personal resistance for possible negative influence of information (disinformation);

- possessing at the necessary degree of personal information culture and culture of information security, [Kol15].

By means of education interaction and positive influence the system of education in the person of students must provide formation of necessary information-communication competence and development of information culture, possession of the ability both to prevent and to remove possible negative influence of the environment.

Subjects of education are sure to have the critical attitude to information and critical thinking based on this which are understood in the following way:

- invariant ability of the subject for assessment and analysis of information new for him in concern with its objectiveness and validity, ethic correctness, compliance with reality, sociocultural and moral values;

- the skill of differentiation of information environment in concern with its usefulness for his personal social development;

– the ability for search of ways of effective and rational problem solving, analysis and synthesis, assessment of network and personal information, identification of its positive and negative aspects, factors.

The formation of critical thinking of the subject of education presupposes “the creation of basic attitude to himself and the world, implying variable, independent, conceived position. This position considerably increases reliability of education because it becomes conscious and reflexive and increases communication potential of the person”, [Zag04]. It means that critical thinking of the subject is an outlook characteristic of the personality.

Therefore the essential conceptual sign, outlook sign, is on the one hand, the ability of the system for formation of the critical attitude to information and critical thinking among students, on the other hand, their adequate possession by all subjects of education, the ability of these subjects for their development together with their personal self-development.

An important role in electronic education with application of digital technologies is played by reproduction and reflection of information as a phenomenon and a process. Formally they belong to communication as here there takes place the flow of information by communication channels, its transmission on the reflective device and reflection itself.

Reproduction of information means its transformation from its digital representation that means restoration of the original image or state, and their reflection by electronic means in accordance with their physics, nature and content. It can be done by the computer by means of multimedia, its peripherals and other special (media) device with the help of special technologies.

Reflection is understood as the creation of valid adequate enough image of the source as its result which has the form available for perception or other actions with it. For information it is visualization, speech, music sounds and so on, available to different sense organs of the man. Modern computer systems, digital and multimedia technologies cope with it well.

As it is on this level that perception, absorption and gaining of offered information by the subject take place, so this stage of communication is the main for any system of electronic education and, thereby, also makes its conceptual sign, the sign of electronic-digital reproduction of educational information.

Electronic education is characterized by a wide range of information-computer technologies of transforming of educational information into different forms and adequate images providing its best perception and absorption, and also by lots of technical means, peripherals and special means intended for its reproduction and reflection.

Contemporary social-information environment is characterized as media, as global media environment, [Kor14]. Respectively, information-educational environment is characterized as a media educational one, or media environment of education. Therefore the characteristic feature of electronic education is its media feature.

“Media” is nowadays much wider than the concept of traditional mass media production, one connects with it all network information of mass consumption coming to the consumer along communication channels, reflected and stored at its inherent material vehicles and reproduced by special means. All these means are also included into the sphere originated by this information and called “media”.

Media include all electronically expressed information for mass consumption and having appropriate consumer qualities, forms of expression and ways of presentation: graphs, music, video, animation, multimedia providing its structural reproduction, colourful visualization accompanied by music and facilitating its better perception. In other words it is presentation of information in the form presupposing purposeful emotional influence of different sense organs of the personality and providing its best perception, absorption and memorizing. Nominally all sense organs of the man are meant, however there are some variants: different subjects and different types of subjects understand information in different ways. The subjects with figurative thinking (the humane) are more inclined for perception of the comprehensive images and their balanced combination, the subject with analytical thinking (the mathematician) – for the perception of ordered information, symbols, tables and schemes.

In the work [Zhi16] media are defined in such a way: “Media includes a very wide range of means and channels of communication transmitting information of different kinds. It is integral, self-organizing substance which, like blood vessels, permeates the whole social organism, all spheres of our life”. It means that in accordance with this definition media means, channels of communication, or media communication, information transmitted by them or media information form a single integral unity. These three components of the single unity are connected by the conformity of both mutual requirement and inner natural qualities without combination of which they can not be “media”.

The characteristic feature of electronic education and the whole modern educational sphere is media education, one of aims of which is that its subject’s mastering of intermediary functions of communication systems, their means and technologies, formation of subject’s skills of conscious and responsible perception of information of social-informational environment, including media information, increasing of effectiveness and productiveness

of its usage; “media education must solve the problem of own information needs awareness, formation of skills of work with informational sources... One need to know how to assess critically validity, reliability of media messages”, [Mir17].

However electronic-digital education offers qualitative expansion of the concept and content of media education that now is taking place:

- Media education as an educational sphere which aim is knowledge, skills, media competency of subjects of education necessary for the work with media information and media means.

- Media education as education comprising productive usage of media information and media means on the basis of possessed knowledge, skills, competency concerning dealing with it.

These two components of media education as a part of a single unity mutually express and mutually develop each other: media competency is the support in gaining subject and other competencies, meanwhile it gets its development. That is, here media education as media teaching is conducted indirectly, in the practice of work with media information that also finds its reflection in personal development of students:

- Direct and indirect influence of media information gets its reflection in personal development and socialization of subjects of education.

- The level of subject competency and media competency increases, personal media culture of subjects of education develops. More generally it means that the level of their informational competency and informational culture increases.

Media competency and media culture of subjects of electronic education act both as products and intellectual means of education (media education). They are necessary for productive self-learning, self-education and self-development of the personality, “media culture is considered by us as the phenomenon with multidirectional modality, which states that media culture is the art of possible in the field of man’s subjectivity in the era of media”, [Sha17].

Media education forms its own field identified as media educational environment which is originated by its conditions, means, resources. “The concept of media educational environment is called for uniting in itself of modern possibilities of storage, gaining and transmission of knowledge necessary for personal development and effective professional training of students in the terms of display culture and the information society”, [Gur].

Thus one of the most important conceptual signs, the sign of media feature of electronic education, is media education which is a characteristic feature, basic form and principle of contemporary education, and orientation at media environment comprising all information-communication environment of this education.

However needs of electronic education are not limited by media means and media technologies. Requirements of reflection and reproduction of media information suppose not only transmission of static images, but also responsiveness, interactivity of their processes, existence of possible active participation in them of addressees themselves. It allows implementing of Smart-education, Smart-means and Smart-technologies [Don13]. The introduction of modern technologies in education, implementing the paradigm of smart education, are given in works [JiS13], in the work [Zen18] a number of common features that characterize the Smart system, corresponding to the principles of Smart education are given. Smart technologies are moving into the category of priority, as it is evidenced by the materials of international conferences, for example, discussions on the subject of Smart education and Smart learning [Mos17].

“SMART-education is such an educational paradigm that supposes adaptive realization of the educational process, possible on the basis of usage of informational SMART-technologies... SMART-education must provide possible usage of advantages of global informational society for satisfying educational needs and interests”.

The difference of Smart-means from media means is in the fact that they not only reproduce media information under the computer control but they themselves are able to process information of Smart-environment independently and autonomously by connecting of the man (the student and the teacher) to it. That is, Smart-means is an independent intellectual system able to process and transform media information independently on-line. Smart-technology is a media technology providing fulfillment of these functions.

Smart-learning is the learning on the basis of Smart-means and Smart-technologies. Therefore in the contemporary education sphere there takes place factual confluence of electronic and Smart-education concepts presupposing each other.

Thus the conceptual sign of electronic education, the sign of Smart-interaction, is orientation at the Smart-system, which is its characteristic feature having the character of integrity and regularity. Much of it is our present and much is the future of the educational sphere. Principally different organization of education and other division of teachers’ work are necessary.

Electronic education presupposes not only different technical and technological equipment, different infrastructure and structure of educational interaction, but different organization and structure of information in its bit-digital presentation and in accordance with conceptual signs of this education. As the means of electronic education this information must get the form expressing its peculiarities and characteristic features facilitating realization of its merits and drawbacks.

As in the whole social-informational environment, in the whole educational sphere, invariant information intended for mass consumption, has the form of the resource, in education – information-education resource, IER. In electronic education the resource has a specific form as an electronic-educational resource – EER. However, electronic educational resource is not simply presentation of IER, but is principally a different system with other form, organization and structure. It is a special educational and a special automated means. Outside this combination there are no specific information resources as an EER. “Electronic educational resource (EER) – educational resource represented in electronic-digital form and including structure, subject content and metadata about them”, [EIE18].

In media education and SMART-education further intellectualization IER and EER is implemented that creates signs of qualitatively new educational media resource:

- media-EER – electronic educational resources in multimedia hypertext form;
- cyber resource constituting together with connected with it cyber technology educational cyber system, having electronic-digital, bit presentation.

Therefore an important conceptual sign of electronic education, the sign of cyber intellectual educational resources, is its orientation of multimedia electronic-educational resources transforming into the state of media EER and cyber resources within educational cyber systems.

With the development of electronic education and qualitative transition of education into media education there takes place the qualitative transformation of its information-communication environment. Media resources and media technologies, cyber resources and cyber systems originate educational cyberspace – systematic electronic-virtual presentation of informational-educational space.

Cyberspace – is the product and the means of informatization providing optimal interaction with the electronic world; its abstract presentation with ordered plenty of dimensions allowing modeling and algorithmization of the way in any possible direction.

Education cyberspace – is a specific part of the whole cyberspace having educational intention and characterized by purposeful educational relations in it. Therefore, inner relations, the structure of educational cyberspace are derivative: they are defined by their relations with subjects of education in concern with their effectiveness, rationality, security.

At the same time educational cyberspace is an electronic-digital image, informational-logic model of real educational space. As an intellectual system it must preserve its content and, therefore, inherit its qualitative conceptual signs together with their meanings. However as an abstract object it has its own specific and formal transmission is not permitted. In particular, a real subject of education is outside cyberspace only actively interacting with it. It doesn't interfere the existence in it of the abstract image of a collective subject of education with the relevant differentiation, that is, pedagogical description of the abstract subject of education presented in a differentiated form.

Cyberspace presents images of real resources and their connections virtually and fully abstractly. Therefore, it may be characterized as unreal. It becomes “alive” only during implementation of its real direct and reverse connections with the man, in their interaction. That's why each subject of education generating educational interaction together with educational cyberspace becomes its forming system and, therefore, the object of pedagogical research (in this case). Chinese scientist Liu Gang points out: “cyberspace, formed by the computer network is nothing else but ... the instrument for investigation of our sense and mind”, [Liu07]. Therefore, interaction with cyberspace develops knowledge and culture of the man while culture and knowledge of the man optimizes this interaction, “scientists have come to the conclusion that informational field of the Internet influences sufficiently on value-conceptual sphere of the personality”, [Ozh12].

Consequently, an important conceptual sign of electronic education, the sign of cyber intellectualization of educational space, is implementation of its real direct and indirect connections with subjects of education, their constructive interaction and orientation at cyber resources within educational cyber systems.

5. Conclusion

Electronic teaching in contemporary education develops within a plenty of conceptual signs which are its characteristic properties and which have the principle meaning for it. These signs in their combination create a conceptual model for it, which is the basis for its relational and logic-semantic description. There are highlighted the following conceptual signs of electronic education.

The sign of dialectical unity – combination of different educational forms in their dialectical unity.

The sign of differential integrity – the ability of each system of education and each subject of education for differentiation and integration of different forms of education.

The sign of knowledge and metaknowledge in digitalization – knowledge of binary-digital expression of information, metaknowledge of electronic education in concern with digitalization.

The sign of communication development of education – a) increasing importance and expansion of its communication environment, b) requirement of preparedness of a subject teaching system for constructive interaction with it.

The outlook sign – a) the ability of the system of education for formation of students' critical thinking b) their possession by subjects of education, the ability of subjects for their development and personal self-development.

The sign of electronic-digital reproduction and reflection of educational information – their defining meaning as forms of communication.

The sign of media feature – media education as a characteristic feature and the basic form of education and orientation at media environment.

The sign of educational Smart-interaction - principle orientation at Smart-systems, provision of readiness for Smart-teaching.

The sign of cyber intellectualization of educational resources – orientation at multimedia electronic educational resources, media EER and cyber resources within educational cyber systems.

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