Essential characteristics and types of digital media in the educational context

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Abstract. The article investigates theoretical aspects of new media and their use in educational context. The author analyzes the concept of "digital" media, their essential features determining specifics of media usage, communication and human interactions. Media literacy and media culture are of special interest to the application of digital media in education. The author presents the own concept of the term "media culture" of individuals emphasizing the importance of value-motivational component of this complex phenomenon. The main task of this work is to understand the nature of digital media and their prospects for educational purposes, how they change the human interaction, what are new needs of the contemporary "media generation" formed or influenced by information and communication tools.

1. Introduction
The information space has always existed around a person. At different stages of its historical development, it was characterized by different levels of locality, completeness, semantic significance, and speed of occurring changes. The turn of XX-XXI marked a qualitatively different level of organization of this space, where information and communication technologies began to play a key role. Amounts of information resources and the number of information channels have been increased. Nowadays, information is evaluated based on a number of new criteria. We also have new data carriers. On a global scale, there is an increase in the number of information resources users. Technical tools created on the basis of computer technology and the Internet provided people with unique opportunities to receive, process, store and use information, and contributed to the creation of a new global culture of media usage. In the context of cultural studies, economics, and education, we talk about the "digital revolution", "digitalization", and "a society built on knowledge and information" [1-3]. Information and communication technologies have passed their own unique development path from just technical (audio-visual) learning tools to mobile and cloud technologies – electronic, new or digital media. Today, they are considered as a complex means of mastering the world around us, which requires certain approaches and algorithms for their effective use in the educational space [4]. Emerging as a result of large-scale technological shifts in the human activity, new media have caused changes in various spheres of our life. Informatization and digitalization affect processes of production and consumption, art, culture, and education.
2. Methodology
The purpose of this work is to consider the essence of digital media, their specific features determining the difference of this technology from the previous media generations, types of digital media that are important for their use in education. This research purpose implies the solution of the following tasks:

- review existing concepts of “digital media”, their essential characteristics, and analyze related scientific categories;
- consider specific features of digital media that present new opportunities for educational system;
- determine some perspective directions of further research in the studied area.

The main methods used in this research include analysis and synthesis of relevant theoretical sources, methods of comparison and generalization. The methodological basis for this work is formed by a system approach, a philosophical concept of dialectical cognition as the basis of scientific pedagogy, a personal-activity approach to the study of pedagogical phenomena, a concept of integration of science, education, and technology. The research sources are sociological, psychological and pedagogical ideas of modern didactics related to informatization and digitalization processed of contemporary education.

3. Literature review
Electronic media refer to those technical devices that make possible multimedia, interactivity, and modeling. These basic characteristics, along with communication and productivity, allow us to talk about new educational functions of information and communication tools. Traditional functions of media (transmission of information, instrument of cognition and education, moral-educational and hedonistic functions, etc.) are transformed in the context of electronic era into complex information educational technologies. On the basis of fundamentally new opportunities, "new" ways of transmitting and perceiving knowledge, evaluating the quality of training, and in general, the versatile development of the student's personality are created. Electronic media allow creating special media products for educational purposes, among which we distinguish electronic publications and electronic resources.

Classifying technical means on the basis of preparation or demonstration of information, there are three groups: devices for presenting ready-made data, devices for preparing data, devices that allow you to prepare and demonstrate existing materials. One of the most significant features of media classification at present is the form of data presentation. According to this criterion, there are two large classes of devices: with analog data recording and with digital data recording. At current stage of their development, electronic (digital) media often combine all three possibilities, that is, they act as tools for creating, processing and presenting information simultaneously.

The digital format of electronic media has significantly expanded their capabilities in relation to all essential characteristics (multimedia, interactivity, modeling ability, communication and productivity) [5], significantly improving the quality of work with information and the functionality of these technologies themselves. Considering the essence of digital media, D.A. Shamshurin notes that “digital (new) media should be understood as cultural objects, as well as high-tech tools that provide access to information on the Internet and have a number of special features: interactivity, multimedia, digital format and high availability” [6].

N.L. Sokolova believes that the term "new media" is used as a synonym for the term "digital media", pointing out the difference between digital media and analog, old, traditional ones, emphasizing the revolutionary changes taking place in the media sphere. After studying new media for several decades, researchers come to the conclusion that many of their characteristics were known earlier, for example, multimedia, hypertextuality, interactivity [7]. According to S. Livingstone, the novelty of the Internet as a media lies in the combination of interactivity with such new characteristics as an unlimited range of content and the global nature of communication [8]. N.L. Sokolova notes that the activity of the audience of new media is not limited to receptive and interpretive practices. It becomes a direct participant in various processes through the production (due to the availability of digital technologies) and distribution of its own, user-generated content [7].
A.A. Lisenkova and A.Yu. Melnikova understand "digital media" as any media content generated by digital means (digital texts, digital audio recording, digital video), while a technical device (smartphone, computer, etc.) always acts as a guide to creating and replicating digital media content. According to these researchers, characteristics inherent in digital media include "interactivity, integration and interdependence on the principle of rhizome, multimedia, hypertextuality, digitalization and the presence of a digital medium" [9]. They also note that digital technologies have changed the way the audience interacts with media. The younger generation now increasingly acts not as "consumers of media discourse", but as "producers" and "creators" of information, forming their own content, leaving their digital footprint in the global information space, and creating their own unique digital experience, thereby creating new meanings, symbols, and images. "New media has generated an active audience that is directly involved in the formation, broadcasting and circulation of media content" [9]. The rapid growth of knowledge and volumes of information in society forces an individual to acquire new skills: to search for and select information, critically evaluate it, navigate in the variety of information flows. There is a significantly increase in the volume and multi-format of media consumption, and the model of this media consumption is changing from the traditional passive to the active individual one. According to A. Toffler, this causes the need to constantly search for information for personal and professional purposes, encourages the revision of internal ideas about the surrounding world in order to constantly be included in the information flow [10].

N.L. Sokolova points out that the ambiguity of such basic categories as "digital media", "new media", "media culture", "media competence" and others is evidence that issues related to the application of information and communication technologies in non-technological areas of human activity are multidimensional and require additional research [7]. On the one hand, media consumption is becoming more and more individualized, on the other hand, there is a trend towards creating network communities and interactions, networking. While continuing to talk about the total informatization and digitalization of the cultural space, including the educational environment, we are seeing an interesting trend today, when offline communication becomes more valuable, significant and preferred than online one. Digital media are not limited to the virtual environment: communication that begins on a particular media platform or is a result of interaction with a particular media product/resource can go beyond the Internet, or exists as an additional option for real interactions [11]. One way or another, there is a shift in values and the priority is given to real (not virtual) classes, training sessions, meetings, trips and excursions. In our opinion, this is partly due to the lack of normal human offline communication in the context of digitalization, and quarantine during the pandemic. In addition, this can be explained in terms of the already solid media experience of two or even 3 generations, from which a person can compare advantages and disadvantages of both virtual and natural communication and set priorities. All this leads to a need for new (further) media research.

4. Results
The word "media" comes from the Latin "medius" or "medium", which means "middle layer". Media is a tool that brings some information from one object to another. Unlike traditional information carriers, modern media transmit data in a digital format (the underlying technology, in its simplest form, includes digital cables, satellites that send binary signals – 0 and 1-to devices that translate them into text, graphic information, audio or video data). On the one hand, one of the essential characteristics of modern information devices is their multimedia nature, that is, the ability to combine several forms of information representation at once. On the other hand, digital devices, digital products, and services created on their basis are still divided by some researchers into audio media (digital radio stations and radio services, podcasts and audio books), visual media (film and television services, virtual reality simulators, video hosting). From the point of view of the key task (the needs of the target audience) and the corresponding content, digital media can be divided into network (social networks, professional network communities), advertising, news, and educational media.

Complex research of "new media", as a rule, goes beyond the analysis of only the field of mass media. Today, the media is increasingly seen as a means that is integrated into various types of human
interaction, communication, into all spheres of society. This is not just about disparate tools, information
and communication technologies, but about the new environment created by the combination of all these
technologies, the environment in which modern people have to live, study and work. Media, in fact,
form a new human environment, a new space for learning, creativity and professional self-realization.

The approach to considering digital media as a tool and source of large-scale socio-cultural changes
has gradually become established in the scientific community. The concept of "cyberculture", introduced
into scientific community by D. Bell [12], was gradually transformed into the concept of "digital culture"
in the context of the development of Web 2.0 technology and a new stage in the development of the
global information and communication network, which was characterized by the fact that the Internet
has become a global communication space, a sphere of educational and professional activities for people,
a tool for entertainment [7]. Thus, it has become important for the study of digital culture not to limit
the research subject to the study of technologies and devices themselves, but to analyze existing media
practices, products of human activity created through digital media, features of media interactions
(interactivity, high speed and density of media communication, media excess, active use of written and
narrative practices in combination with audio-visual content, synchronicity and asynchrony of
communication, globality and locality of interactions, multiplatform and multi-channel, etc.).

5. Conclusion
It is necessary to understand that the role of knowledge and information in our society is growing, and
consequently there is a need to form and develop the media culture of modern people. At the same time,
in our opinion, it is fundamental to distinguish the concepts of "media culture" from "media literacy" or
"digital literacy". Both terms are quite ambiguous. Under digital literacy, N.D. Berman understands a
certain "set of knowledge and skills that are necessary for the safe and effective use of digital
technologies...", as well as "...this is the ability of a person to use digital tools for the own benefit".
According to this researcher, "digital literacy" includes three aspects: media competence (skills to search
for and find the required information, analyze and evaluate it), media consumption (ability to navigate
through media flows) and media security (recognition of manipulations in the media environment) [13].
Media culture of a human is a more complex phenomenon. This is an integrated feature that defines not
only knowledge, skill-based and activity aspects of media actions, but also value-motivational one,
allowing you to be an active participant in the media space not only as active and critical of media
consumer of information but also as a creator of content in the global information space.

Thus, the phenomenon of digital media is unique and multidimensional. First of all, these qualities
are manifested in the fact that digital practices are somehow reflected in all spheres of human life. The
media of the modern, digital, generation themselves cause large-scale changes in the socio-cultural
environment, expanding the boundaries and tasks of media consumption, enabling users to get a unique
experience of creating their own media content, media product or information resource, influencing
existing forms of interaction between people, giving new properties to human communication, as well
as forming a special socio-cultural reality with its own specific characteristics.

Based on the essential characteristics of digital media, we can talk about the following opportunities
for using these tools in education:

- modeling of the studied processes and phenomena,
- broad demonstration capabilities of the studied processes and phenomena for a large educational
  audience, and the ability to demonstrate phenomena in dynamics, revealing retrospective and
  prospective aspects of their interpretation;
- computer visualization of processes and phenomena inaccessible to direct perception;
- interactive management of simulated processes (virtual participation of students in the analyzed
  process or phenomenon);
- individualization and differentiation of the learning process (development of individual
  educational trajectories);
• new scales of current and final control over students' cognitive activity, receiving and processing feedback;
• students can create their own content (productive use of media) [14].

However, there are a number of contradictions that need to be resolved in the process of using digital media in education between:

• the need to regulate the information saturation of training sessions and independent work of students and the variety, multidirectional information flows of different quality that affect the educational audience;
• the multimedia nature of digital technologies and insufficient expression of the emotional component of educational interaction when using media;
• a strong motivational component of learning through new media (interest and media experience of students) and high requirements for self-discipline in the process of digital or distance learning;
• the productivity provided by modern media, and the need to conduct double preparation for training sessions using media in case there are technical problems.

Results of a research project "Social networks as unique educational resource-2014" [15] showed what participants in the educational process themselves note as advantages and disadvantages of using digital technologies in the training process. Advantages include rich opportunities for feedback, commenting and discussion of educational subjects’ actions, exchange of opinions and experience, saving time due to the possibility of flexible organization of the educational process, availability of information, ease of use, the ability to get information about certain facts from different sources, visualization. Among the negative aspects of using digital tools in education, the survey participants named the risk of obtaining information from unreliable sources and subsequently using this information as a source of knowledge.

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