

# *Development of digital culture of higher school students*

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**Abstract** — The article deals with development of digital culture as an important condition of on-line and distance learning which are considered to be progressive and effective as they allow students to get complete and new information in any area rather quickly. The role of digital culture in digital environment is growing year by year because contemporary society generates a great amount of information flow that requires not only ability to orient yourself within it and to use them in educational and professional activity but also for being competitive in new informational society. Digital culture is a part of human culture which objectively characterizes the level of all information processes of society and existing informational relations. Digital learning makes students have a need to search necessary information, conceive it and create their own information "product". Such organization of the learning process where the learner is placed in an environment where there is a complex solution of educational problems. It seems to be the most effective form of learning for development of students' digital culture.

**Keywords** — *digital culture, on-line learning, distance learning, the Internet, information-communication technologies.*

## I. INTRODUCTION

Installation of information-communication technologies in education is an active process. It is tightly connected with interactive and cognitive facilities provided by the Internet. Saving time, financial, physical resources of the subject in obtaining education makes online learning more and more relevant for both students and teachers. The Internet gives us opportunities to overcome the space-time boundaries that complicate obtaining a prestigious, decent education in the leading educational institutions of the country and in the world [1].

Using modern information technologies is a necessary condition for development of more effective approaches to teaching and improving teaching methods and techniques. A special role in this process is played by information-communication technologies. It's proved that their application helps to increase the motivation of students' learning, save educational time. Interactivity and visibility contribute to a better presentation, understanding and assimilation of educational material.

Only information technologies allow students to get complete and new information in any area rather quickly. Information technologies make it possible to use text, sound, graphic and video information at the lessons in a new way, and make it possible to use a variety of information sources. Experience has shown that students actively working with

computer educational programs form a higher level of self-educational skills, the ability to navigate in the turbulent flow of information, the ability to highlight the main thing, to generalize, to draw conclusions [2].

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All mentioned above factors actualize the issues of developing digital culture of higher school graduates. Scientists consider digital culture to be readiness for independent information activity focused on purposeful gaining and improving.

Today there is every reason to talk about formation of a new information culture (IC), which can become an element of the general culture of mankind. It can be based on knowledge of information environment, laws of its functioning; the ability to navigate information flows.

## II. DIGITAL CULTURE AS A BASIS FOR DIGITAL EDUCATION

Digital Culture is the contemporary phase of communication technologies, electronic broadcast culture and educational objects, and that is deeply amplified and accelerated by the popularity of networked computers, personalized technologies and digital images.

The emergence of digital culture is usually associated with a set of practices based on the ever more intensive use of communication technologies.

Digital culture stands, first of all, for the changes brought about by the emergence of digital, networked and personalized media in our society and the passing from communication phases centered on print and broadcast media, to more personalized and networked media, that use digital compressing and processing capacities at their core. The consequences of such processes in societal terms and the means via which media technologies transform our modes of interaction and representation are absolutely evident [3].

The process of digital educational process is considered to be a complicated structural socio-technical process which trains a person to live and act in digital society that requires formation and development of his digital culture. Thus, we can

suppose that informatization issues and formation and development of digital culture are technical problems as well as humanitarian ones [4].

We can't but agree with the point of view of N. Gendina, who proves, that digital culture shouldn't be fully equaled with technical aspects of working with information/ In other words, with computer literacy. Digital culture should be considered as a part of general culture of a person and presents a combination of informational world view [5].

Digital culture is a part of human culture which objectively characterizes the level of all information processes of society and existing informational relations.

Speaking about the role of digital culture we can confirm that the role of digital environment in the life of people and society is growing year by year, that requires well-developed digital culture of a person because contemporary society generates a great amount of information flow that requires not only ability to orient yourself within and to use them in educational and professional activity but also for being competitive in new informational society.

Education information system development, which is greatly increasing nowadays, creates more and more conditions for formation of a new type personality who is prepared to life in digital environment.

In this respect it is possible to prove that digital culture refers to not only values, agreements, thoughts in today's society but also how people communicate within that society

Proving importance of developing digital culture of students and teachers David V. Loertscher and Blanche Wools show the result of investigations done on the advantages of online teaching. These researches showed that students are usually quite satisfied with the opportunity to study in their homes rather than being forced to move to a different location for one or more years. They believe they have greater choice for personal relevance in the courses they take. They perceive that the knowledge they are gaining is useful. They enjoy the ability to choose when they can study and when they can respond to the class work allowing them to work at their own pace. They find the learning to be both active and authentic, and this type of class allows them to improve their computer knowledge [6].

### III. ON-LINE LEARNING AND DISTANCE LEARNING IN EDUCATIONAL PROCESS

Moreover, on-line education makes the process of learning more comfortable and relaxing. David V. Loertscher highlights that many students cite the ability to be "invisible" in that they will not be judged on their features, race, body size, or physical disability making it an equal ground for all. Teachers also feel that this type of instruction allows them to get feedback from every student in the class rather than the ones who, in a face-to-face classroom, volunteer to be called upon to answer. While they must revisit their classes each semester, much of what they have prepared for one class will carry over into the next.

The downside for students is that, in a totally online environment, they meet neither teacher nor classmates in person. All contact is online, e-mail, postings to a course management system or an e-forum. They often have little sense of community, and if they do, they have to create a virtual community via social media. In many situations, students may not have adequate personal computing hardware, software, or fast enough internet connections. Further, if they have few computing skills, they may not have adequate training to carry out their assignments [6].

Investigating on-line teaching and learning Dr. Neelam Parmar notices that the integration of mobile technology in classrooms is no longer just a nice-to-have option in teaching and learning. Indeed, it has now become part of the educational process for the 21st century generation, where the choice of device is also no more the focus of discussion. Regardless of whether the school has adopted one of the popular online collaborative platforms, be it Google, Windows or Apple, what is and will always be of utmost importance, is how the teachers are integrating the technology in their teaching practices and what learning outcomes the children produce.

The introduction of subject specific educational apps was initially and is to an extent as yet, the most common use of EdTech in schools of any grade. Educational apps have been found to appeal to children and add variety to teaching and learning. In the classrooms, teachers use them to enhance and enrich their lessons in specialist areas, such as in practicing multiplication tables, learning phonics, encouraging writing and creativity. Indeed, the author has a full spreadsheet of subject related apps to meet curriculum objectives. But we must also be careful, as educational apps can also be used as a playful learning tool having little or no pedagogic instruction, resulting in limiting impact on the user [7].

The effective use of technology in education has changed the face of education and it has created more educational opportunities. Both teachers and students have benefited from various educational technologies, teachers have learned how to integrate technology in their classrooms and students are getting more interested in learning with technology. The use of technology in education has removed educational boundaries, both students and teachers can collaborate in real time using advanced educational technologies [8].

Hundreds of digital education tools have been created with the purpose of giving autonomy to the student, improving the administration of academic processes, encouraging collaboration, and facilitating communication between teachers and learners. The major digital tools available to teachers to enhance learning in the classroom:

- FUSE is a content library of teaching materials and educational resources. It covers traditional text resources, multimedia, video and interactives.
- Global 2 is the Department's blogging community. Teachers and students can post and comment on blogs, collaborate on wikis and set up discussion forums. Levels of access can also be customized.

- Virtual learning and conferencing enables students to interact and learn with others outside their classroom.
- Digital learning software is supposed to provide state school students and teachers with comprehensive, up-to-date digital tools and software to support the implementation on-line educational on-line courses. Provision of this software reduces costs to schools and families and includes students' Bring Your Own Devices programme.
- Collaborative learning environments should provide Google Apps for Education and Microsoft Office 365 online services provide schools with access to contemporary digital classroom tools and support for BYOD through services that can be accessed on Windows, Apple, Android and ChromeBooks. Google Apps includes: Gmail for students, Drive, Google suite (docs/sheets/slides/calendar), Google classroom, Forms and Hangouts.
- Creative Cloud apps and design and Web K-12 collection can be used across a range of Learning Areas for the creation of documents, animations, audio, videos and websites. In addition, this software has specific relevance to learning and teaching of The Arts, Technologies and Critical and Creative Thinking
- ClickView is a suite of thousands of interactive videos and related resources that support learning and teaching across all subject areas. Videos are professionally made in Melbourne studios or sourced from free-to-air and pay-TV content.
- Stile provides over 70 Science units, each containing a mixture of content delivery, formative assessment, summative assessment, experiments, projects, classroom activities. Every unit of work is set in the context of real-world science discoveries and events, highlighting to students the relevance of what they are learning. Every lesson is completely customisable, allowing teachers to tailor content and questions to the needs of their school's curriculum or individual students. Teachers can even create their own Stile lessons if they want to get really creative.
- Sibelius is a music notation program designed for composing, orchestrating and designing workshops. Music teachers who incorporate Sibelius into their lessons are able to demonstrate music theory and composition concepts, and students are able to create their own pieces of music while developing their understanding of these concepts. This software has specific relevance to learning and teaching of Music [8].

There is the whole list of other educational digital tools which help teachers to make their lessons more vivid, interactive and creative. Some of the most widely used are Edmodo, Socrative, Projqt, Thinglink, TED-Ed, cK-12, ClassDojo, eduClipper, Storybird, Animoto, Kahoot! [8].

We absolutely agree with Dr. Neelam Parmar that for creating great digital teaching where the use of technology can

intensify learning and development, an appropriate EdTech pedagogic workflow that incorporates traditional elements of teaching practices and the use of current mobile technology becomes necessary. «This pedagogic workflow is the disappearance of walls and enclosed structure of the classroom, in which both the teacher and student can communicate seamlessly through various digital channels and in which they become co-learners. This can be constructed using a virtual classroom platform» [7].

According to the author on-line teaching requires «the use of a blended learning approach where technology becomes transparent and «in which the student and teacher can flip between pen and paper to online tools for capturing digital data and to share information among themselves and peers». It should include a seamless and effective feedback and assessment journey, which can take place in real time with the intent of creating more successful achievement outcomes using options such as the Google or Microsoft Classroom ecosystem» [7].

This process involves the compilation of all materials in one location, sewing together various teaching resources of videos, images, worksheets, quizzes and content, linking them to external applications such as YouTube, e-books, and subject specific apps that are both transferable and available to the students anywhere, at anytime and in any place.

In this respect digital culture is considered to be a necessary feature of a person who conceives and produces information. Being a part of general culture, it has strong connection with social nature of a person and appears to be a product of different personal creative abilities.

More to the point, digital culture is a tool of adaptation to conditions of outside environment and a way of harmonization of person's inner world in the process of the whole volume of socially important information [8].

T. Nagoenova and A. Chikin point out that digital culture is a phenomenon which determines a way of life, motivation, forms and manners of communication and person's behavior in this historical period [10].

We understand and regard digital culture as:

1. Modern information technology and its competent use in processes of studying, working and in everyday living;
2. A component of the person's education and professional competence in professional activity;
- 3) A set of general cultural and professional competences in the process of using information and communication technologies in the process of interaction.

Digital culture is tightly connected with digital ethics that should be obeyed by all participants of interaction while using information-communication technologies. They should be aware of rules of building rapport and interrelation with other users in digital environment, of rules of presenting information about themselves. They know and properly understand the essence of the notion «cybersecurity», and regulations of creating it; they are conscious of «boarders» in information environment.

Contemporary higher school students come across with a number of difficulties: where to find necessary information, where to search it, how to save it, how to download it without pirating, how to sum up and analyze gained information. Today higher school students don't only get knowledge, but also master new skills: working with graphic editors, IT-programs, web-technologies, digital tools and others.

Informatization of education is a complicated structural socio-technical process which deals with preparing a person to life activities in digital society and developing his digital culture. I. Sannikova and M. Kornilova point out that issues of informatization and developing personal digital culture are not only of technical but also humanitarian character [4].

N. Bykova and E. Vaulin emphasize that informatization of education creates more and more conditions for developing a new type of personality prepared for life in information society. One of these conditions is the intensive elaboration and implementation of distance-learning technologies in a number of Russian universities. Nowadays the educational needs of society are aimed at educational satisfaction that is achievable on condition that in the process of teaching educators use models, methods and forms of education, which are based on information and communication technologies of flexible, open, distance learning [11].

Becton Loveless determines distance learning as «an educational process where students receive instruction through online classes, video recordings, video conferencing, or any other audio/visual technology medium. It enables people to receive education without having to be physically present in a classroom» [12].

Distance learning "is a synthetic, integral humanistic form of education, based on the use of a wide range of traditional and new information technologies and their technical means, which are used to deliver educational material, its independent study, dialogue between a teacher and a student, and a learning process is generally uncritical to their location in space and time, as well as to a specific educational institution" [13].

Distance learning is "a form of education in which interaction of teachers and students and students with each other is carried out at a distance and reflects all the components inherent in the educational process (goals, content, methods, organizational forms, learning tools), implemented by specific means of Internet technologies or other means providing interactivity" [14].

Distance learning has made education more accessible to larger groups of people. It is a convenient way to obtain work experience while studying at colleges, universities or other vocational training. Education has also changed as communication technology has revolutionized society.

Distance learning enables to combine students' independent cognitive activity with a variety of sources of information, educational materials provided by teachers, various mechanisms of feedback and control, communication with a teacher, consultants and other students in frames of a course, group, project and research work. Such complex approach to the organization of learning process gives

opportunity not only to master educational material effectively, but also to develop personal qualities of students, in particular, digital culture.

Practicing distance learning we involve students into digital environment that enables students to acquire new knowledge, form conditions for arousing conscious desire of getting knowledge, working with information in order to support objectives.

S.V. Sharov points out some peculiarities of distance learning such as modality, changing a teacher's role, separating participants of educational process by distance, virtual cooperation of training, prevalence of self-control over control from a teacher, use of modern specialized technologies and means of training, etc.

The author draws attention to the main areas of application of distant learning. It includes:

- advanced training and specialization of teachers;
- training students in certain academic subjects for taking exams;
- preparation of students for entering a high school of a certain profile;
- organization of subject oriented educational program;
- extended education;
- professional retraining;
- professional distance training [15].

Distant learning is considered to be a new level of developing full and part time education which is supplied by using information technologies by means of personal computers, video and audio devices, Cosmos and fiber-optic tools.

Besides it's important to mention that distance learning is essentially different from conventional teaching because it creates new educational digital environment that is necessary for self-determined students who know which knowledge, skills, and abilities they require.

It is considered that a distinguish feature of distance learning is enabling students to get essential knowledge independently using developed information resources: databases, computer and multimedia, training and monitoring systems, video and audio recordings, electronic libraries, as well as traditional textbooks and instruction booklets.

#### IV. RESULTS OF INVESTIGATION

In spite of the fact that on-line learning and distance learning have much in common. We shouldn't consider these terms as interchangeable. There are some very significant differences that can change the way that each course is taught and what a student can expect to get out of it.

On-line and distance learning are considered to be progressive forms of education. But nowadays they arouse a range of psychological – pedagogical problems which should be solved by teachers and learners:

- Difficulties of establishing interpersonal contacts of participants of educational process;
- Problems of organizing effectively working small study groups when studying in cooperation;
- Assessment of individual peculiarities of students' perception of information and their styles of learning for better organization of educational process;
- Actualization and maintaining students' motivation to learning a subject;
- Teacher's sufficiency and capability to chosen methods and techniques for on-line and distance teaching.

TABLE I. DISTANCE AND ON-LINE PECULIAR FEATURES

Distance and on-line peculiar features		
Criteria	Distance learning	On-line learning
Delivering educational material	Materials and learning resources are sent to students via post or email and students must complete the set tasks according to the course schedule. In Virtual Online Classrooms, lecturers can use PowerPoint to deliver real time lectures to the students and have real time conversation with them.	We utilize a virtual learning environment to share our recorded lectures and student resources. These lectures can be watched at any time, enabling students to create a study timetable that fits around their work and family commitments.
Interaction with other students	On a distance learning course, often the only interaction with a Student Adviser is when assignments are submitted for marking; it's also rare to interact with fellow students. Lecturers run regular live online lectures that students are encouraged to attend, enabling them to communicate in real-time.	Learners also have the opportunity to discuss questions and chat with fellow students via online discussion forums, providing a valuable network of support and feedback.
Freedom	This freedom not to attend lectures or examinations at set times makes distance learning courses perfect for students with families or careers to manage, as the student sets their own pace and timetable of study.	Students are also able to access module notes and review assignments at any time and all of our textbooks are provided in eBook format.
The role of a teacher in educational process	Adviser should be the organizer, director, helper and facilitator, who stimulate the student's motivation, innovation, and creativity in order to achieve the learning purpose.	Adviser should be the organizer, director, helper and facilitator, who stimulate the student's motivation, innovation, and creativity in order to achieve the learning purpose.
Tools for interacting with	Adviser interacts with students via regular tutoring classes, a variety of forms of chatting, lectures and office hours, through short messages, using one-on-one intertwine software, during Telephone office hour	Adviser who is available via email and phone can answer any questions that a student might have about academic processes, their workload or the virtual learning experience
Students' opportunities	Students have an opportunity to work independently: set necessary information and required knowledge, using such tools as date bases, computer, multimedia and testing systems, video and audio recordings, e-libraries, conventional textbooks	Students also have the opportunity to interact with their course tutors on a regular basis, with sessions and regular feedback at the end of each structured module.

The teacher's activity during digital educational (on-line and distance learning) process can be presented graphically (fig 1)

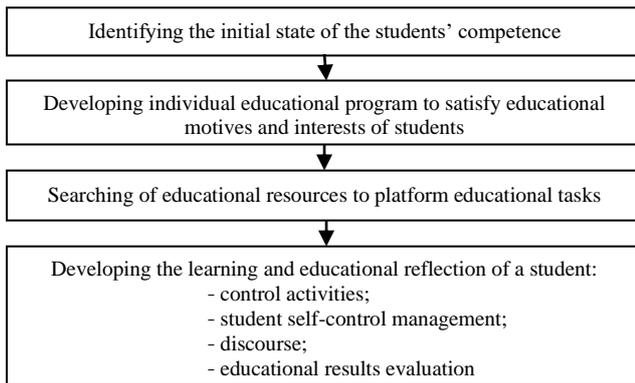


Fig 1. The teacher's activity during digital educational (on-line and distance learning)

Working in digital environment a teacher should fulfill the whole range of functions.

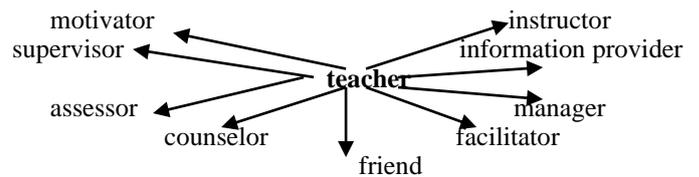


Fig. 2 Roles of a teacher in on-line and distance learning

Gui Ying emphasizes that modern distance learning not only means a change of the media for learning but also the philosophy of teaching. One thing that is similar between these two systems is that both systems advocate the student-centered approach but both hold that teachers are important in distance – learning and on-line learning. Teachers have missions in directing the students to do well in distance environment and their work now is more challenging [16].

That's why they should acquire digital culture and digital literacy because schools and universities are introducing technology into all segments of their work – from online lessons and homework uploads to student chats and forums and digitalized administration. Nowadays, students learn in virtual classrooms, teachers post homework assignments on school websites, lessons are packed with videos and live demos from online sources. Students' and teachers' files are stored and maintained electronically, as well as their profiles, grades, ratings, and assessments.

## V. RESULTS OF USING ON-LINE AND DISTANCE TECHNOLOGIES

Use of digital technologies in education has introduced quite significant changes to the learning process, calling for new methodologies, new content, and new teaching media and, of course, new hardware and technologies to be used in the process of learning.

Investigating the degree of students' satisfaction with digital education we have found out that most students of Ural state pedagogical university (120 interviewed students) are satisfied by condition and results of on-line and distance learning:

1. Completely satisfied – 5%
2. Generally satisfied – 64%
3. Partly satisfied – 19%
4. Unsatisfied – 5%

Students identify the following positive features of digital education at the present stage of development of society through the use of digital culture include:

- distance;
- relative freedom of access;
- lack of strict rules and regulations;
- activity of subjects of the educational process;
- mixing of styles, genres and directions of information;
- constant updating of information;
- the ability to participate in meetings, conferences, readings;
- allows to expand the experience of communication;
- access to professional training programs, etc.

Teacher add such advantages as

- Opportunity to use modern educational forms to provide high interactivity and multimedia of teaching;
- Opportunity to differentiate students' levels of knowledge and abilities for individualization of teaching;
- Opportunity to offer various kinds of educational activity orienting students to acquire skills of solving problems on the basis of knowledge and skills in frames of the subject;
- Opportunity to use independent and group work;
- Opportunity to practice model structure of educational program which contains various ways of planning.

Speaking about drawbacks of digital learning it is necessary to mention that this kind of education is in great demand of grown-ups who are busy at their permanent work, who are short of time necessary for education. Many of them have humanitarian education and low level of computer skills. That is why there is apparent discrepancy between a minimal

required level of using computer technologies and a real level of students' skills. It arouses necessity to organize a number of off-line trainings aimed to teach students to use systems of on-line or distance technologies before involving them into digital educational environment.

Students should get skills to use personal online account, to send carried-out tasks to an adviser, to understand reports of their work, to send a question to a counselor or another student, independent search of information and its interpretation.

## VI. CONCLUSION

Digital learning makes students have a need to search necessary information, conceive it and create their own information "product" which a student sends to the teacher on its basis. Such organization of the learning process where the learner is placed in an environment where there is a complex solution of educational problems. It seems to be the most effective form of learning for development of students' digital culture.

The use of information and communication technologies opens up new opportunities in the teaching of its subject, allows increasing the effectiveness of training, the intellectual level of trainees, instilling the skills of self-education, self-organization, and facilitating the solution of practical problems. There was an opportunity to increase the visibility in the teaching process.

Solving educational tasks while working within the program of the subject is a priority, but we should not forget that the activity, to which we orient students, uses on-line learning and distance educational technologies, creates conditions for the development of skills of independent work with information both in the educational space of the University and outside it.

Digital education forms consciousness in getting, interpretation and using information. It enables students to form ideological structure of a personality, allow it to critically approach the process of selection and assimilation of information.

These conditions allow us to say that the use of distance learning technologies enables students to intensify the development of students' information culture, and the students themselves have the opportunity to obtain academic knowledge effectively, get skills of working with information, develop the ability to navigate in information flows and work with information.

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