The Model of Distance Education of the Designer in the Frames of Computer Project Graphics*

Elena Zaeva-Burdonskaya and Daria Kardashenko

Moscow State Stroganov Academy of Design and Applied Arts, Moscow, Russian Federation
lenartt@gmail.com, dkardashenko@gmail.com

Abstract. The article considers the potential of computer graphic modeling based on the experience of distance learning in design and art disciplines at the Department of Environmental design of the Stroganov Academy. An analysis of both practical and theoretical work of the Department during the semester made it possible to conclude that the model for the integration of full-time and distance learning, the individual and interactive approaches to the student is optimal for schools of creative arts. The experiment revealed the greatest flexibility and adaptability to the online format of the methodological material of the disciplines of graphic tools, its maximum openness to self-study, its role in innovative forms of design work, of the creative search for student's own learning style.

Keywords: Distance Learning, Computer Graphics, Design.

1 Introduction

There is no single theory for learning in general; this is also true for online education. Today we have a number of theories of online education based on traditional teaching methods. The main purpose of this article is to analyse some ways to transform the model of visual and graphic content of traditional design education in a school of creative arts in terms of its compliance with the online educational environment.

The theory of distance education has received sufficient justification abroad. in Various forms of distance learning existed since the 1840s starting from the primitive format of information transmission such as "pigeon mail" and up to theoretical explanations of distance education, undertaken by leading experts. "Traditionally, theories of distance education have been derived from classical European or American models based on correspondence study» [1]. Researchers, including B. Holmberg, C. A. Wedemeyer, D. Sewart, M. G. Moore etc. have formed the main theoretical postulates of distance education as a systematically organized form of self-learning - at a distance, through the media, etc. Such postulates are relevant to this day.

Telecommunication systems have significantly changed the practice of distance learning (for example, the equivalence theory of M. Simonson [2]), focusing on two aspects of distance education: independent work and the use of media for educational communication.

Some ways of work with CAD graphics in a new remote media format were presented in the educational process of the Department of Environmental design of Moscow State Stroganov Academy of Design and Applied Arts. The uniqueness of the graphic pattern is formed by the multidisciplinary structure of the Department. Teaching, training of bachelors and masters is conducted according to the programs of Environmental Design and Multimedia Design.

Despite the difference of the final project product (certificate of professional qualification of the student), the most important common basis for those two profiles is CAD technology. If computer graphics takes an important place in the full-time format of training, then in the conditions of distance learning this tool becomes the only possible form of visualization, replacing modelling, manual drawing, sketching, etc.

The existing graphic techniques are undergoing their maximum transformation in the technology of training and conducting of professional design and propaedeutic disciplines. In the new remote dialogue between teacher and student old methods of presentation are not effective.

Normally, a person receives 80% of the information through vision. If the educational information flow is restricted exclusively to visual images that are familiar and necessary in an art school, the requirements for this visual material are seriously

increasing. It takes on new functions and is loaded with new qualities that previously accompanied the teacher's face-to-face dialogue with the student. The historically established tradition of transferring the experience of "art craft" from the master to the student in the oral form of consulting based on an aesthetic subjective assessment of the project material has been replaced by impersonal, but more universal criteria for evaluating virtual technologies. Stroganov school of design as a professional integrity is focused basically on the reproduction of knowledge and the entire learning process, its processes are cyclical. In 2020 with its situation of forced self-isolation, the remote format with its virtual graphics platform assumed the role of a model of professional creative education.

1.1 Modern trends in distance education at the heart of new creative challenges

Distance education is an international phenomenon that has radically changed the methods and approaches to the educational process. The basis of the positive vector is that "…modern telecommunications and electronic publications can overcome the shortcomings of traditional forms of education, while maintaining all their advantages… Distance learning technology is …the process of independent, but controlled development of a certain volume of knowledge" [3] and as a result - unlimited potential for independent work; possibility of additional consultations (in any appropriate time); high economic efficiency and low costs in comparison with full-time

forms; social accessibility; "openness, individual pace of classes, new opportunities for student's creative self-expression" [4], etc.

The main aim of the distance education is "to ensure that the entire educational system is ahead of the curve and is focused on the problems of the future post-industrial civilization... to increase creativity in education in order to be ready for activities in various social environments" [5]. According to D.Keegan it is "…this concept of industrial, open, non-traditional education that will change the practice of learning" [6]. Students should receive learning experiences tailored to the environment and the situation in which they are located.

Considering all the above prospective requirements "…it's logical to turn to possible options for organizing distance learning, their specifics, to determine for what purposes this or that option may be most acceptable and under what conditions; secondly, what impact does it have on the organization of the educational process, the selection of content, methods, organizational forms and means of training" [7]. Those. the task is to create your own model of distance learning, acceptable in an school of creative arts with its priority of figurative visual thinking.

1.2 Factor of innovative technologies in distance education

Electronic technologies of distance education, having introduced themselves into the system of higher art education, received an impetus for development and supplemented the methodology of the teacher with new technological and interactive potential.

In distance learning of higher schools, a set of methodological materials, such as "…case technology and network technology –computer training programs and electronic textbooks, ... and television-satellite technology can be considered as an independent form of education of the 21st century, as well as an innovative component of full-time and distance learning" [8]. This implies the use of special learning servers with a complex structure; cloud storages with large amounts of data that every student has access to; computer telecommunications: video lectures and video classes; e-mail and chat technologies (for asynchronous classes), webinars, etc.

The digital format of distance learning programs for environmental and multimedia design realizes the advantages of visual and graphic tools with minimal involvement of a humanitarian intermediary. The expressive language of graphics that speaks without words became an only possible language of the new distance communication.

2 Method

2.1 Interactive approach to technology of distant education for the designer

It's very hard to write a good tutorial for designers. And by the way almost no one has written it yet. As a rule, the educational literature is limited either to the analysis of a narrow project topic, or to the general theory of plastic composition. Computer textbooks from the collections of the "Hind" electronic library system provided assistance in preparing for independent classes, including training in graphic editors. Extremely useful material, among other things, was a textbook and a workshop for universities

"Digital technologies in design. History, theory, practice", published in the Stroganov Academy under the editorship of A.N.Lavrentyev.

In the creative sphere, the methods of full-time training are not formatted in a set of strict rules and still keeps the memory of "workshop skills". The aura and charisma of teacher's personality, clearly present in traditional full-time education, is compensated by the capabilities of IT technologies that use virtual instead of traditional means. The uniqueness of teacher's individual methodology is partially preserved even in the situation of distant education.

Among the various types of distance learning technologies that are used in Russia, "the most promising and widely used is Internet technology" [9]. These are: a case technology - the author's "set of textual, audiovisual and multimedia teaching materials, ready for distribution for independent study by students during the organization of regular consultations with tutors" [10]; systematic consultations in the format of video classes (Skype); video lessons and reviews in the Discord service.

The core of such technology is digital graphic material relating to various aspects of design. Actual working graphic or video materials and current graphic tasks have become available in the structured, according to the curriculum, Mega cloud storage service. The service has become an optimal tool for the exchange and control of visual graphic information.

Remote work with the use of information technology has great flexibility and adaptive capabilities, allows one to apply the school's traditional individual approach to the personality of each student. The graphic visualization still remains the main way of implementing the author's solution.

The main used interactive format of Internet technologies in training are webinars. The online format of classes at the Department of Environmental Design arose long before today and began precisely with training programs for graphic editors: After effects, Premier Pro and Cinema 4D - all in the format of webinars. Initially, for that purpose the Youtube.com platform together with programs capturing the image on the monitor was used. Afterwards it was decided to abandon this method in favor of video conferences in the Zoom program. The author of the programs is a teacher of the Department – D. E. Kardashenko.

The format of video conferences (consultations) made it possible to compensate for the "teacher's personality" factor significantly and gave an optimal quality to the video-graphic material presented by online comments. The fundamental principle of art education remains the priority of creative principles implemented in an individual (humanitarian) approach on the art and graphic material of the project.

The distance between the teacher and the student enhances the interest in the dynamic graphics format, which has a great potential for information. Video allows one to reflect the procedural nature of the design. The format for the presentation of educational material by a teacher often becomes reoriented from a static PowerPoint presentation model to its dynamic model, which includes graphic video content. Different video formats such as avi, Mpeg4, etc. become an opportunity to reveal the latent nature of creativity, and often the only possible way to explain to a student design tasks: the creation and functioning of mobile application interfaces; examples of the formation of design concepts from design to prototype, etc. Video recording of

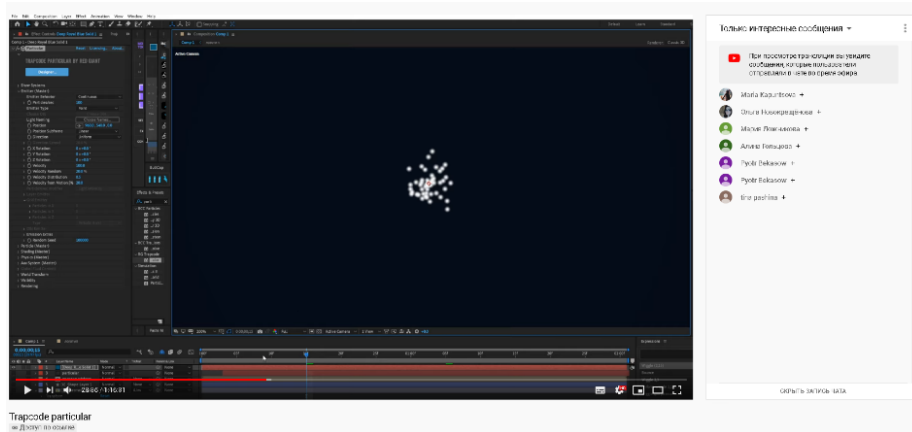the master classes allows you to introduce the student to the technique and tools of a particular study.

Fig. 1. Page of the webinar program on the topic "Basics of Trapcode Particular" for 3rd year students of the Multimedia Design program.
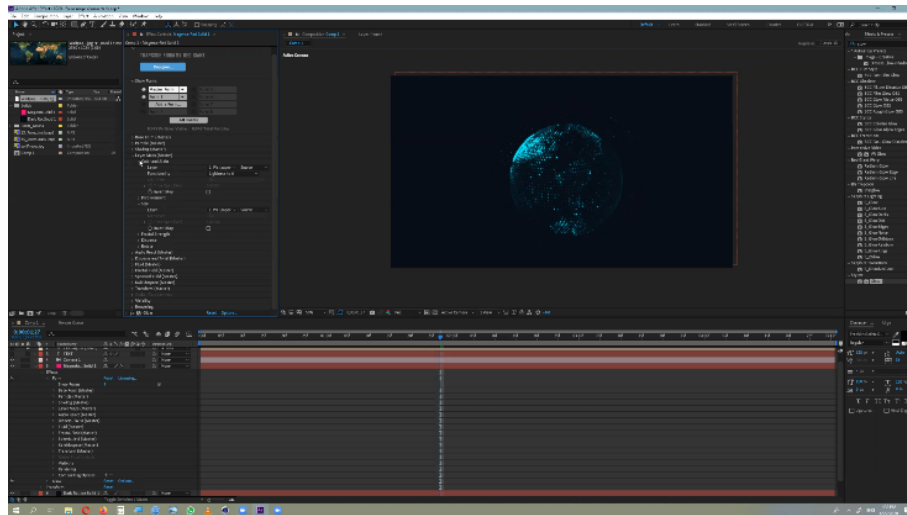

Fig. 2. Screen capture during a Zoom-conference on the topic "Creating holograms in After effects using the Trapcode Form plugin"

2.2 Specificity of the design and graphic studies for the designer in the situation of distance education

The main difficulty of distance education in design lies in its creative artistic basis. Creativity, compensating for the humanitarian deficit, penetrates even into the technical model of computer technology training. The technical methods of working in

Adobe After Effects are invested in the final task in a story video with a musical basis.

Fluency in graphic techniques and software capabilities liberates the student's creative thinking process. The focus on an experiment and the discovery that follows, are the integral parts of the creative process and the creation of a new, previously non-existent, imaginative project concept that is present in every student project. How can one convey the creative intent of a project using conditional graphics? In that situation the combined representation of an idea or concept in static illustrative graphics, collage, animated format, video shooting, three-dimensional prototyping, etc. comes to the rescue.

The distance format drew special attention to the research phase of the Master's degree and projects in the field of interactive design of the Multimedia profile. This required a change in the graphic composition of the project. A layer of digital infographic has appeared.

Graphic visualization using software packages of 3d max, Cinema 4D; 2d orthogonal projections of environmental objects are supplemented by graphical analytical diagrams and graphs. Distance learning emphasizes the stage of pre-project research and increases the role of infographics in term and degree projects. The tasks of lighting design in environmental content are starting with the introduction of the Dialux EVO version 9.0 and Adobe After Effects programs. Distance learning of manual project graphics is partially compensated by the possibilities of computer illustration – an integral part of multimedia and environmental projects. To make a sketch, Adobe Illustrator and Adobe Photoshop programs are used. Illustrative rendered graphic images become the basis for subsequent character animation.

2.3 Methods of artistic design in the format of distance education

"We consider distance education as an independent system, one of the forms of education. It is therefore logical to turn to the possible options for organizing distance learning, their specifics, in order to determine, first, for what purposes this or that option may be most acceptable and under what conditions, and secondly, what is the specificity of the components of each of the possible options, namely: what impact does this or that option have on the organization of the educational process, the selection of content, methods, organizational forms and means of training" [6]. The implementation of the Internet-technical resources of education chosen by the Department can be illustrated by term projects created on the profiles of Multimedia Design and Environmental Design.

The process of switching to distance learning in the Multimedia Design profile, where the experience of implementing information technologies in the educational process began long before the quarantine, was quite smooth. The proprietary free messenger Discord became a technological solution for conducting classes (consultations of teachers Ivanova E. and Kuznetsova E.) with students in the discipline "Design". A whole group could simultaneously see each other's work and be able to comment on it. This brought classes as close as possible to offline consultations: stu-

dents showed their home work and received comments in the format of an audio conversation with a demonstration of a personal computer screen.

The virtual resource, however, allowed teachers to clearly follow the project management methodology. On the first stage students showed presentations with research on the future topic of the project and after its "approval" conducted a step-by-step analysis of the social, ergonomic, geographical, economic, and other points of view. Sociological analysis of consumer model which is necessary for creating a website or mobile app project requires a serious pre-project research and visualization of its results.
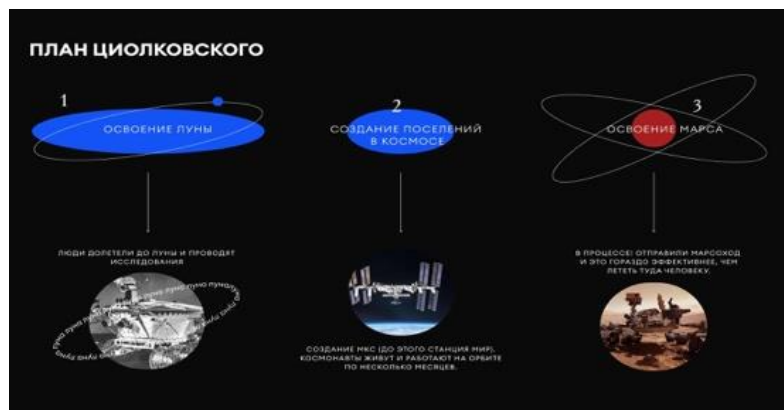

Fig. 3. Pre-project analysis for the "Project of media reconstruction for the Museum of Cosmonautics named after Tsiolkovsky. T.Pashina Tutors: senior teacher E.A. Kuznetsova, E.V.Malkova.

The research results became the basis for the project solution. Spatial visualization in 3d max / Cinema 4D programs was demonstrated in the render format.
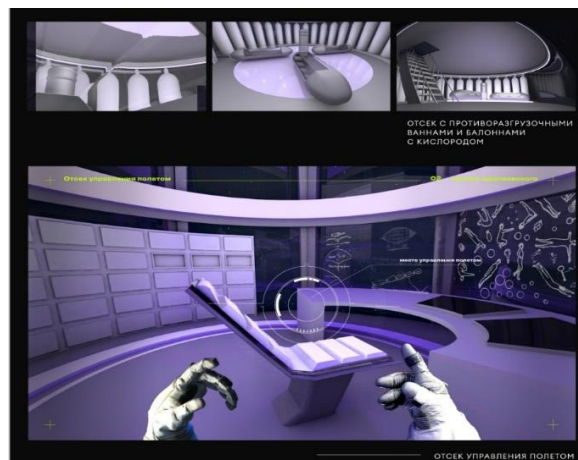

Fig. 4. Stillframe VR applications

Figma and/or Tilda software tools were used to design prototype interfaces. Students shared links to web pages with prototypes in a general chat. The final implementation of the project included a study designed in a landing page, a graphic image (1500x1500 mm) and a video clip. Interactive prototypes on the project theme were used.
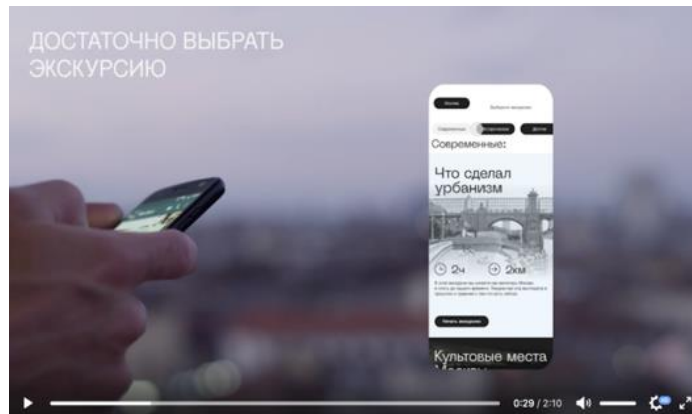

Fig. 5. A frame from a video demonstrating the capabilities of the Journey tour app. P.Bakasov. Tutors: senior teacher E.A. Kuznetsova, E.V.Malkova.

According to tutors E.Ivanova and E.Kuznetsova, one of the advantages of distance learning is the maximum use of modern technologies on the example of Zoom, Discord, Mega, Figma, Tilda services, which are necessary for future specialists in the field of interactive design. The online format taught students to present their work clearly, concisely and more competently.

Fig. 6. Demonstration of stillframes on the training server in the Discord program.

According to tutors E.Ivanova and E.Kuznetsova, one of the advantages of distance learning is the maximum use of modern technologies on the example of Zoom, Discord, Mega, Figma, Tilda services, which are necessary for future specialists in the field of interactive design. The online format taught students to present their work clearly, concisely and more competently.
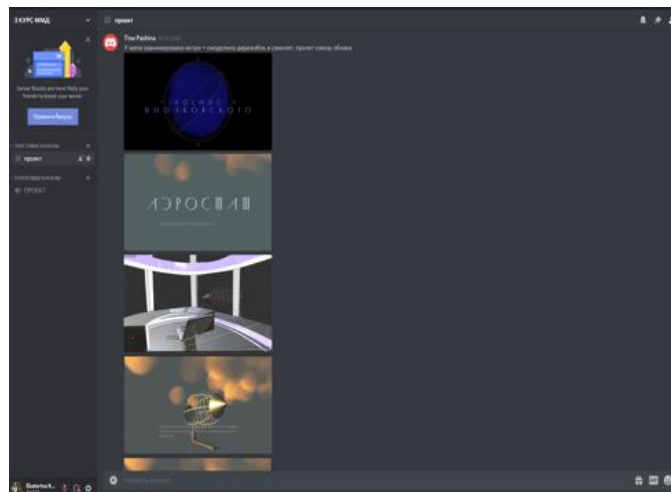
The environmental approach has become the basis for the analysis and development of complex projects for interior and exterior environments. Due to the withdrawal of traditional sketches "by hand" and its replacement with computer graphic visualization, the program SketchUp, which has a great potential for graphic tools, attracted attention. It became a useful addition to 3d max / Cinema 4D programs involved in creating of 3D visualizations of environmental projects.

The developed innovative solutions of imaginative project content are demonstrated in integrated computer multimedia environments: PDF presentations, project presentations, readymag.com website that allows to create online presentations with any graphic content, etc.

3 Results

In the current situation of forced distance learning format, it is advisable to talk about the formation of the Distinctive Distance Education Design, which defines the pedagogical methods used in courses, synchronous and asynchronous communications, etc. [11]. For design and graphic training at the Department a comprehensive approach was chosen that is optimal for the distance learning format. The Mega cloud platform, Discord voice, video, and text chat, Zoom video conferences, webinar programs, and graphical software package became an information technology model that compensated for its forced limitations and shortcomings. The model took into account the obvious priority of independent work of the student and opened the way to the creative search for one's own style of learning. With the repeating of the material and ability to return to the past, the remote format paved the way for a more advanced study of the capabilities and technologies of computer graphic modeling, which make up more than half of the project tasks.

The format of distant learning required additional motivation for the student. "It is the motivation to get really solid knowledge that is the driving force for distance learning" [12]. In the current circumstances, maintaining interest in learning requires also additional and very serious efforts from the teacher. A new result of the remote format was socially oriented project work motivated by the forced coronovirus pandemic. On the Multimedia profile projects include additional graphical development of virtual spaces designed for remote operation (sites of various companies, application-based services, scenarios for virtual Museum excursions, etc.).

With a sharp change in project and educational tasks, as in the situation of restructuring the entire education system for the period of self-isolation in March 2020, the optimal solution is to get acquainted with as many techniques and methods of work of the teacher with the student as possible. The great potential of information and graphic tools allowed us to quickly reconstruct the creative process in a remote format

without loss of mutual understanding and violation of interpersonal relations, to speak the same "language".

The disadvantages of distance work include a significant share of the responsibility, self-discipline and initiative required from the student. Distance makes the organization and management of learning imperfect, does not provide systematic feedback, reduces the indicator of sociability, personal contact of students with each other and with teachers is minimal or in the worst case there is no contact at all. For the full-weight work of the group as a whole the need for traditional contact classes in the Academy's classrooms is necessary.

4   Conclusion

Distance education appeared at the stage of standardization of training programs, on the wave of globalization processes. Online training at an art school has become a forced exclusive measure, which is not typical for solving creative tasks. Moving away from the traditional model levels the aesthetic and emotional cross-section of the dialogue between "Teacher" and "Student", disrupts the delicate balance of the humanitarian artistic aspect and the innovative-technological origin. The trend of standardization is in direct conflict with creative tasks: to preserve the individuality and creative portrait of the student.

Of all possible models the one created by H.Gardner (Frames of Mind: The Theory of Multiple Intelligences. New York: Basic Books. 1983) is the closest to desired: "…an integrated model that described the phenomenon of pedagogically driven online education. Key to this model is the assumption that online education has evolved as a subset of learning in general rather than a subset of distance learning. As blended learning, which combines face-to-face and online instruction, evolves into the dominant form of instruction throughout all levels of education, it serves as the basis for an integrated model" [13]. "The integration of full-time and distance learning" [6] is the most promising model based on higher education, which will allow obtaining advanced knowledge. "The integration of distance and full-time studies is very promising in terms of ... training for individual programs" [6] that is increasingly present for various reasons in art schools. Computer graphic tools open the way to a possible online learning format as an unlimited opportunity to implement one's creative ideas. Graphical modeling serves the main purpose of distance learning: "t0 provide students with elements of universal education that will enable them to adapt effectively to changing socio-economic conditions and successfully integrate into modern society" [14]. The universality of online teaching methods for interactive design is confirmed with the opinion of teachers of the Department of Environmental Design specializing on multimedia design.

Evgeniya Ivanova: "The new format of the "Interface" discipline inspired me to optimize part of the work online and add new tools to the program. I consider the experiment on distance learning of the discipline "interface" to be successful and I am ready to use its individual aspects further on."

Ekaterina Kuznetsova: "Working in an audience and in personal communication with students, computer disciplines, especially in the field of animation and three-dimensional modeling are learned better and faster due to the personal contact with the teacher. At the same time, a big advantage of distance learning is the simplification of knowledge control due to the " transparency" of the control system."

References

1. Pyari D. Theory and Distance Education: At a Glance. 2011, 5th International Conference on Distance Learning and Education IPCSIT vol.12 (2011) © (2011) IACSIT Press, Singapore. – P. 94-98. https://www.semanticscholar.org/paper/Theory-and-Distance-Education A-At-a-Glance-Pyari/c74032c62cf005ead31ba44b8a91ab421131704d

2. Simonson M. Equivalency theory and distance education. TechTrends, 1998. Vol. 43/Issue 5: pp. 5-8.

3. Turkan V. Alizade. The role of distance learning in modern education. «Colloquium-journal»#3(27),2019 / TECHNICAL SCIENCE - P. 17-18. https://cyberleninka.ru/article/n/the-role-of-distance-learning-in-modern-education

4. Absalyamova M. Tekhnologii distancionnogo obucheniya. https://si-sv.com/publ/1/tekhnologii_distancionnogo_obuchenija/14-1-0-8

5. Distancionnye tekhnologii v obrazovanii. http://www.eduportal44.ru/sites/RSMO-test/SiteAssets/SitePages/2019_09_Dopobrazovanie_Distancionnaya programma/Distancionnye tekhnologii v obrazovanii.pdfHistory, Theory, and Quality Indicators of Distance Education: A Literature Review. https://www.eurashe.eu/library/modernising-phe/mobility/virtual/WG4 R distanceed.pdf

6. Polat E.S. Modeli distancionnogo obucheniya. https://hr-portal.ru/article/modeli-distancionnogo-obucheniya-polat-es

7. Sharov V.S. Distancionnoe obuchenie: forma, tekhnologiya, sredstvo / V.S. SHarov // Izvestiya Rossijskogo gosudarstvennogo pedagogicheskogo universiteta im. A. I. Gercena. 2009. – № 94. – S. 236-240.

8. https://lib.herzen.spb.ru/text/sharov_94_236_240.pdf

9. Andreev A.A., Soldatkin V.I. Distancionnoe obuchenie i distancionnye obrazova-tel'nye tekhnologii. Elektronnyĭ zhurnal Cloud of Science. 2013. No 1. – ss. 14-20. https://cyberleninka.ru/article/n/distantsionnoe-obuchenie-i-distantsionnye-obrazovatelnye-tehnologii

10. Distancionnye tekhnologii v obrazovanii. http://www.eduportal44.ru/sites/RSMO-test/SiteAssets/SitePages/2019_09_Допобразование_Дистанционная программа/Дистанционные технологии в образовании.pdf

11. Fuller R.G., Kuhne G.W., Frey B.A. Distinctive Distance Education Design: Models for Differentiated Instruction. 2011. - 227 p. https://www.igi-global.com/book/distinctive-distance-education-design/40284

12. Habibulina E.M. Distancionnoe obuchenie: osnovnye terminy, principy i modeli. https://nsportal.ru/vuz/pedagogicheskie-nauki/library/2011/12/07/distantsionnoe-obuchenieosnovnye-terminy-printsipy-i

13. Picciano A.G. Theories and frameworks for online education: Seeking an integrated model. Online Learning,21(3),2017.P. 166-190. https://files.eric.ed.gov/fulltext/EJ1154117.pdf

14. Distancionnaya forma obucheniya kak innovacionnaya obrazovatel'naya model'. https://infourok.ru/distancionnaya-forma-obucheniya-kak-innovacionnaya-obrazovatelnaya-model-4006452.html