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The Model of Implementation of Distance Learning in Out-Of-School Education Institutions

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The Model of Implementation of Distance Learning in Out-Of-School Education Institutions

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ABSTRACT

The educational community boldly began to master and use digital technologies as a means of interaction with students, when organizing distance learning. Teachers began to look for new forms and methods of working with children. The aim of the study is to determine, substantiate and experimentally verify the effectiveness of the model of distance learning implementation in out-of-school education institutions. The experiment was carried out in the period from 2021–2022 academic year on the basis of the Poltava Regional Center for Scientific and Technical Creativity of Pupil Youth of the Poltava Regional Council. 118 teachers of the Poltava Regional Center of Scientific and Technical Creativity of Pupil Youth of the Poltava Regional Council took part in the survey and ranking. Research methods: analysis of scientific and methodical literature; pedagogical observation; pedagogical experiment; pedagogical testing; methods of mathematical statistics. Results of the pedagogical experiment proved the effectiveness of the distance learning implementation model in out-of-school education institutions, which consists of theoretical, technological and reflective blocks, which is confirmed by qualitative modeling.

Keywords: model, distance learning, out-of-school education institutions, pedagogical conditions, students.

INTRODUCTION

During the period of forced quarantine, the Ministry of Education and Science of Ukraine recommends using elements and forms of distance learning under conditions of restrictions on the educational process for the effective organization of training of students of general secondary education institutions. For the majority of educators in the country, this form of organization of the educational process is new and causes many difficulties and inconveniences. And despite this, the educational community boldly began to master and use digital technologies as a means of interaction with students, when organizing distance learning. Teachers began to look for new forms and methods of working with children. For extracurriculars, distance learning is an absolute innovation that breaks all stereotypes of the educational process in such institutions (Otravenko et al., 2021; Topuzov et al., 2021). A special mission is assigned to the heads of groups of out-of-school (extracurricular) education institutions. Loaded with online lessons and homework, children need relief, creative and creative work. Therefore, by organizing distance learning, the leaders of groups of extracurricular institutions aim to relieve children physically and emotionally, to interest them in a new format of work, to give

an opportunity to show creativity, imagination. Distance education has its advantages and disadvantages, and the most important thing is that children are not left out.

Analysis of scientific output of scientists (Lau, 2000; Bykov, 2005; Karakoyun et al., 2009; Griban et al., 2018; Kornosenko Ferri et al., 2020; Zhamardiy et al., 2020; Kononets et al., 2021; Emetc et al., 2022; Kulich et al., 2022; Shkola et al., 2022) shows that there is a lack of research in the scientific and pedagogical literature focused on the development of a model for the implementation of distance learning in out-of-school education institutions. At the same time, the issue of the introduction of distance learning into the educational process of educational institutions is considered as an innovation, which is a tool and a means of ensuring equal access to quality educational services for all education seekers in all fields.

MATERIALS AND METHODS

The aim of the study is to determine, substantiate and experimentally verify the effectiveness of the model of distance learning implementation in out-of-school education institutions.

Following tasks of research were set:

- 1) specify the information and digital tools of the distance educational process in out-of-school education institutions;
- 2) to develop a model for the implementation of distance learning in out-of-school education institutions;
- 3) experimentally verify the effectiveness of the distance learning implementation model in out-of-school education institutions.

The research hypothesis is that the process of distance learning in extracurricular education institutions will be effective if pedagogical conditions are implemented:

- 1) professional development of teachers of out-of-school education institutions under the program «Practice of distance learning: what, where, when and how»;
- 2) resource orientation when choosing forms of organization of training in extracurricular education based on modern digital technologies and services;
- 3) application of personally-oriented training of students in the educational process of extracurricular education institutions.

The experiment was carried out in the period from 2021–2022 academic year on the basis of the Poltava Regional Center for Scientific and Technical Creativity of Pupil Youth of the Poltava Regional Council – the leading institution of out-of-school education in the region. 118 teachers of the Poltava Regional Center of Scientific and Technical Creativity of Pupil Youth of the Poltava Regional Council took part in the survey and ranking. The course of the experimental work was determined by the goal and tasks of our research (to specify the information and digital toolkit of the distance educational process in extracurricular education institutions; to develop and experimentally verify the effectiveness of the model for the implementation of distance learning in extracurricular education institutions) and primarily involved hypothesis testing.

A set of such research methods was used to solve the tasks:

- 1) theoretical – analysis, synthesis, comparison, comparison (for the study of literary sources, regulatory documents, experience of conducting distance learning; determination of methodological approaches to solving the problem of implementing distance learning in out-of-school education institutions);
- 2) empirical – questionnaires, interviews, surveys, observation of teachers of extracurricular education institutions and students; pedagogical modeling (for the development of a model for the implementation of distance learning in out-of-school education institutions); a pedagogical experiment (to check the effectiveness of the distance learning implementation model in out-of-school education institutions); qualitative models (to determine the effectiveness of pedagogical conditions).
- 3) mathematical statistics – for the quantitative and qualitative analysis of the research results and proving their statistical reliability. They were used to identify the reliability of the difference between the studied indicators, the correct processing of the results, reflecting them in graphical and tabular forms, conducting experimental testing; descriptive statistics, determination of the statistical significance of differences between groups by correlation analysis by Pearson's method.

RESULTS AND DISCUSSION

Distance learning in Ukraine is regulated by a number of regulatory documents: «The National Doctrine of Education Development» (On the National Doctrine of Education Development, 2002), «Concept for the Development of Distance Education in Ukraine» (Concept for the Development of Distance Education in Ukraine, 2000), «National Informatization Program» (On the National Informatization Program, 1998), laws of Ukraine «On education» (On education, 2017), «On Out-of-School education» (On Out-of-School education, 2000), by the order of the Ministry of Education and Science of Ukraine «On approving the Regulations on distance learning» (Regulations on distance education, 2004).

Article 18 of the Law of Ukraine «On Out-of-School Education» states that out-of-school education is carried out differentiated according to the individual capabilities, interests, inclinations, abilities of pupils, students and

listeners, taking into account their age, psychophysical characteristics, state of health in various organizational forms, among which there is distance learning (On Out-of-School education, 2000).

Regardless of the forms and methods of education, one of the main tasks of out-of-school education, defined by the Law of Ukraine «On Out-of-school Education», is to create conditions for the creative, intellectual, spiritual and physical development of pupils, students and listeners; search, development and support of capable, gifted and talented pupils, students, listeners (On Out-of-School education, 2000).

Current issues of the organization of the educational process in out-of-school education institutions are:

- ensuring free choice by each child of the direction and type of activity, taking into account his abilities, inclinations and needs, creative, intellectual, spiritual and physical development;
- application of personal-oriented technologies in the educational process;
- implementation of competence and activity approaches in educational activities of the institution;
- creation of conditions for social-pedagogical, psychological-pedagogical support of students from «vulnerable» categories;
- organization of vocational training of pupils;
- modernization of the content of educational programs, forms and methods of education and upbringing;
- cooperation of out-of-school education institutions with public organizations, with local self-government bodies, with secondary general education institutions and educational institutions of all levels;
- development of information and communication technologies, organization of distance learning in extracurricular educational institutions, including for children with special needs.

Distance education is a form of organization and implementation of the educational process, according to which its participants (object and subject of education) carry out educational interaction in principle and mainly extraterritorially (i.e., at a distance that does not allow and does not provide for direct face-to-face educational interaction of the participants, otherwise, when the participants are territorially outside the limits of possible direct educational interaction and when during the learning process their personal presence in certain educational premises of the educational institution is not mandatory) (Bykov, 2005).

Despite the peculiarities and specifics of distance learning, the activity of extracurricular education institutions should be aimed at:

- the activity of extracurricular educational institutions of ecological and naturalistic orientation is aimed at the development of educational forms of educational work on the comprehensive study of nature and agriculture (flower growing, forestry, horticulture, beekeeping), expanding knowledge about environmental protection, solving environmental problems, forming environmental awareness;
- the activities of tourism and local history extracurricular activities will be aimed at studying the history of the native region and the environment, forming a sense of patriotism in children and young people, mastering practical skills and abilities in tourism and local history, promoting a healthy lifestyle;
- activities of extracurricular scientific and technical educational institutions to develop the interest of children and young people in scientific and technical creativity, broadening the scientific worldview, creating conditions for students to acquire technical and technological abilities and skills, activation of rationalization and invention, design and research activities;
- activities of extracurricular educational institutions of the artistic and aesthetic direction for the development of creative abilities, the formation of a personal and valuable attitude to art, the development of aesthetic consciousness, the ability for self-realization and self-improvement, the main tasks remain the expansion and enrichment of the artistic and aesthetic experience, the mastery of artistic abilities and skills in practical activities, formation of artistic competence;
- the activity of extracurricular educational institutions of the system of the Small Academy of Sciences of Ukraine is aimed at the implementation of the main task – finding, supporting and developing gifted children and youth capable of scientific activity (Distance education in modern educational activity, 2019).

In the conditions that have developed in the country today, out-of-school education institutions are unprepared for such challenges, because they do not have work experience and experience in distance learning. Pedagogical workers, for whom distance learning is an innovation, during quarantine are forced to look for and master various forms and means of working with children. The challenge for teachers was the availability of a large number of means and possibilities of digital communications.

A number of studies (Rachel et al., 2017; Hromalik et al., 2018; Moritz et al., 2021) show that children in out-of-school education institutions not only in Ukraine, but also in other countries continue to experience difficulties during online learning that are not related to the quality of technology or the speed of the Internet.

Most of the factors affecting the quality of distance learning can be divided into:

- a) factors related to the professional and personal qualities of the teacher (desire to implement online education, availability of the necessary competencies to implement this form of education);
- b) factors related to the organization of distance education in an out-of-school education institution (access to the necessary materials, quality of technical equipment, Internet speed);
- c) factors related to children.

Trying to solve these problems, we have developed a model for the implementation of distance learning in out-of-school education institutions, which consists of theoretical, technological and reflexive blocks.

The theoretical block of the model is represented by the goal and methodological approaches (environmental, person-oriented, resource-based, integrative, communicative, project, creative), which serve as a guide in achieving this goal.

According to the features of extracurricular education, didactic principles (accessibility, clarity, naturalness, systematicity and consistency, awareness and activity of learning, strength of knowledge, emotionality, connection of learning and education) are of key importance, on which it is advisable to focus during implementation of the model, as well as the principles of distance learning (humanization and humanization of learning, individualization of learning, interactivity, mobility, continuity, openness, flexibility, freedom of choice), which are also included in the theoretical block of the model.

The technological block includes pedagogical conditions for the implementation of distance learning in out-of-school education institutions:

- 1) professional development of teachers of out-of-school education institutions under the program «Practice of distance learning: what, where, when and how»;
- 2) resource orientation when choosing forms of organization of training in extracurricular education based on modern digital technologies and services;
- 3) application of personally-oriented training of students in the educational process of extracurricular education institutions.

Pedagogical technologies used during their implementation were included in the block: contextual learning, resource-based learning, personal-oriented technologies, digital technologies, project technologies, game technologies.

The content of the model block is complemented by the information and digital toolkit of the distance educational process in out-of-school education institutions (Table 1).

Table 1. Information and digital toolkit of the distance educational process in out-of-school education institutions

Name	Description	Function
E-mail	Standard Internet service.	Ensures the transmission of messages, both in the form of ordinary texts and in other forms (graphs, tables, videos, presentations, drawings, photos); in the education system, e-mail is used to organize communication between a teacher and a student, as well as between students.
Forum class	A popular type of communication on the Internet.	The most common form of communication between the teacher and students during distance learning, everyone who is interested in certain information can view it conveniently and quickly on the forum.
Chat classes	Internet resource.	Communication of network users in real time, a means of prompt communication of people via the Internet.
Video conference	One of the modern methods of communication, which allows classes to be held in «distant classes» when students and the teacher are at a distance.	real-time online conference, held on the specified day and at the specified time: discussion and decision-making, discussions, project protection take place in real time.
Blog	a personal resource where the right to publish belongs to one person or group of people.	In the blog, the teacher can set tasks for students, children can highlight the results of their work in their blogs (photos, videos, presentations), the ability to comment on messages can cause discussion.
Google Classroom	Free service for educational institutions.	Allows you to organize online training using video, text and graphic information, various Google applications, the teacher has the opportunity to monitor, systematize, evaluate activities, view the results of tasks, apply various forms of evaluation.
Zoom	Service for organizing online conferences and video communication, currently the most popular	It helps to conduct classes on the specified day and at the specified time. Discussion and decision-making, discussions, project protection take place in real time. The teacher and students can see each other, the teacher

	online resource for distance learning.	has the opportunity to accompany the lecture with visual material, one of the modern methods of communication, which allows classes to be held in «distant classes», when students and the teacher are at a distance.
Social networks and Viber	A social structure formed by individuals or organizations.	Allow you to create closed groups, chats, discussion of topics, tasks, problems, information.
Youtube	Popular video hosting that provides video hosting services.	It is used to view video materials related to various topics.
Jamboard	Digital interactive whiteboard.	A virtual whiteboard where you can work on ideas together with others in real time.

The reflection block of the model contains reflection methods, thanks to which teachers of extracurricular education institutions carry out the reflection stage of remote classes with students. Examples of methods:

Reflexive online lesson «Say in one sentence»:

- I found out in class today...
- I learned...
- I performed the tasks...
- I was able...
- It was useful for me to know...
- I liked ...
- It was difficult ...
- I understood...
- I will definitely tell you at home ...
- Now I can ...
- It was interesting ...
- It was difficult for me...
- I was surprised ...
- Now I know what ...
- It was not clear to me ...
- I wanted to find out why ...

Reflective method «Open answers». Method is used to determine the assimilation of the content of the educational material.

- I liked what we did in the online class because ...
- This information will be useful because ...

Reflective method «Notes». Using Jamboard's Pinned Note tool, students record their personal accomplishments in class.

Reflective method «plus-minus-interesting». This exercise with the help of the Jamboard service allows the teacher to look at the lesson through the eyes of the students, analyze it from the point of view of value for each student.

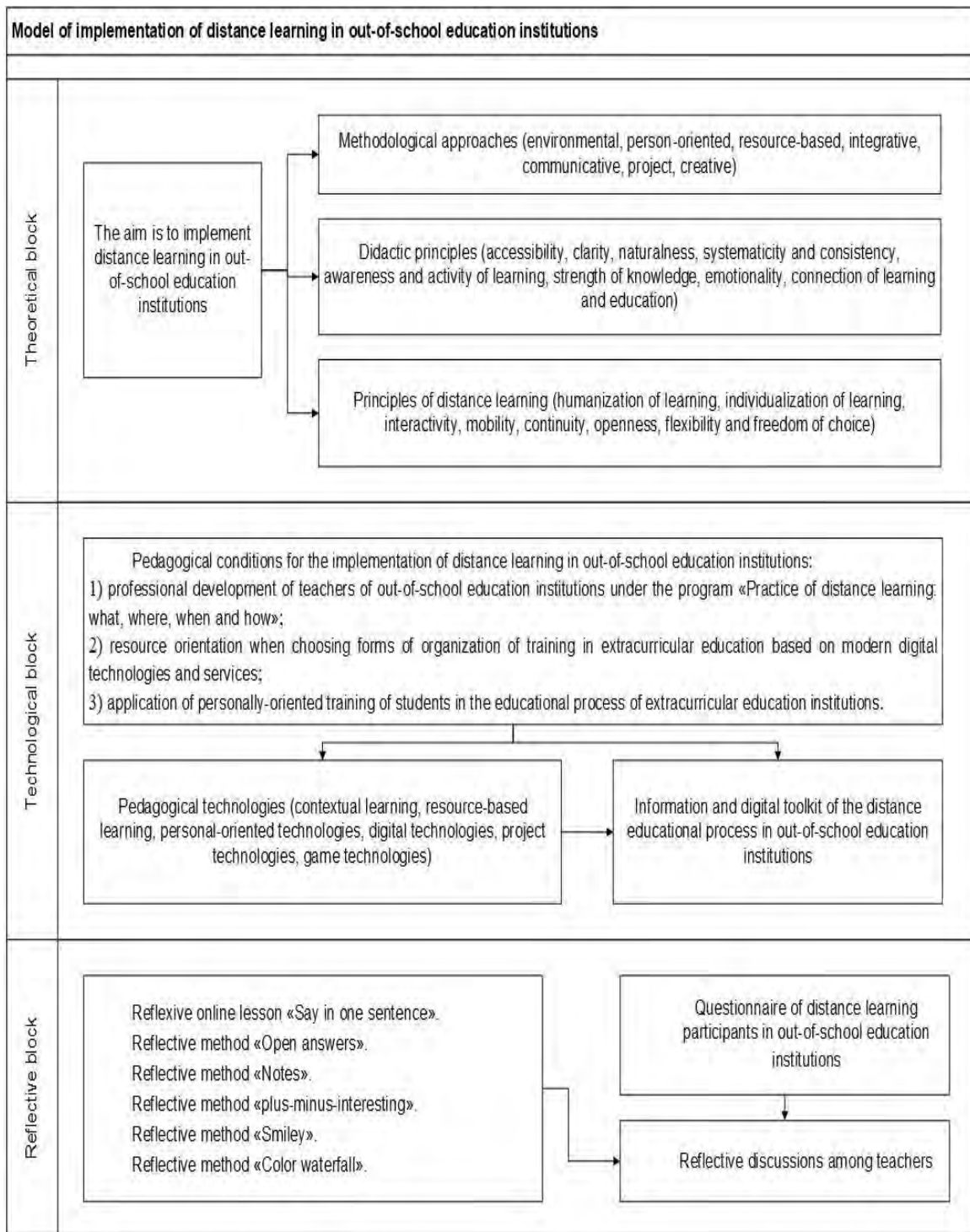


Fig. 1. Model of implementation of distance learning in out-of-school education institutions

In the column «P» / «plus» / – students put a mark and tell everything that they liked in the lesson, that seemed interesting and useful.

In the column «M» / «minus» / – students put everything that was not liked or seemed difficult, incomprehensible.

In the column «C» / «curious» / – students put interesting facts learned in class or whatever else they would like to know.

Reflective method «Smiley». Students use emoticons to signal to the teacher «Everything is clear», «Question» or «Need help», etc.

Reflective method «Color waterfall». Students evaluate their work in class. They hang stickers of the corresponding color on the Jamboard virtual interactive board.

The model of the implementation of distance learning in out-of-school education institutions is presented in

Figure 1.

Within the framework of the implementation of the model, the following pedagogical conditions for the implementation of distance learning in out-of-school education institutions were tested:

- 1) professional development of teachers of out-of-school education institutions under the program «Practice of distance learning: what, where, when and how»;
- 2) resource orientation when choosing forms of organization of training in extracurricular education based on modern digital technologies and services;
- 3) application of personally-oriented training of students in the educational process of extracurricular education institutions.

The organization of distance learning is highlighted on the website pages (Fig. 2).



Fig. 2. «Distance learning» page of the website of the Poltava Regional Center of Scientific and Technical Creativity of Pupil Youth of the Poltava Regional Council

In the course of the experiment, it was found that for the organization of distance learning it is not enough to move classes online without changing methods and approaches. Teachers used the information and digital tools of the distance educational process in out-of-school education institutions and learned to freely use modern educational electronic resources, organize work and motivate children to study, establish feedback and monitor the results of distance learning. Online classes were aimed at students mastering the skills of independent educational work and at forming key competencies in students.

It was recorded that the specifics of online learning based on digital technologies, Internet resources and services (Table 2) affect the methods of content selection and structuring, ways of implementing certain methods and organizational forms of education, which significantly influenced the functioning of the entire system of extracurricular education based on the Poltava Regional Center for Scientific and Technical Creativity of Pupil Youth of the Poltava Regional Council. Students selected and processed information, put forward hypotheses, made decisions based on their own reflections, their own vision of the problem. At the center of knowledge is a problem that requires the work of thought to solve it. The student's cognitive and thinking activity allowed him to go beyond the received information, to build new knowledge. The role of the network teacher is emphasized, which consists in helping students, stimulating them to independent thinking, discoveries, new views on the studied phenomenon or subject. At the same time, the teacher and student remain participants in this process in an active dialogue. With the help of digital services, feedback between teachers and children is established, which is a condition for successful learning. Confirmation of the effectiveness of remote work of pedagogical workers are posts on social networks and coverage of work on the institution's website.

The most popular demonstration of distance learning among out-of-school teachers is the holding of master classes, as feedback video and photo materials of the group members about the completed task, as well as the holding of a group class in the form of a video conference via the zoom platform.

Extracurricular teachers constantly organized and held extramural competitions, flash mobs and challenges. Distance learning provided an opportunity for professional growth for out-of-school teachers. The online space has opened up great opportunities to find a lot of new and interesting things for yourself, to form new skills for working in programs, to get ideas for implementation, to be inspired by the interesting experiences of

colleagues. Out-of-school teachers increased their professional qualifications with a minimum separation from the educational process because they received the necessary knowledge on the methods of organizing and improving the online educational process under the program «Practice of distance learning: what, where, when and how»; increased the level of professional competence and general culture; presented their developments regarding this type of education; developed educational programs, methodological recommendations and manuals.

Confirmation of self-education for pedagogical workers is publications, participation in conferences with the receipt of a certificate, publication of methodological developments, abstracts of articles, coverage of posts in social networks.

Methodical departments of out-of-school education institutions actively worked on the development of prospective work plans, summarized the materials of teachers' work experience, familiarized themselves with innovations in the activities of out-of-school education institutions of Ukraine, monitored the work of pedagogical staff of the institution.

Before and after the experiment, a qualitative model was used to assess the effectiveness of pedagogical conditions for the implementation of distance learning in out-of-school education institutions.

Table 2 shows a qualitative model for evaluating the effectiveness of pedagogical conditions for the implementation of distance learning in out-of-school education institutions, the content of which reflects the data obtained after the experiment.

Table 2. A qualitative model for evaluating the effectiveness of pedagogical conditions for the implementation of distance learning in out-of-school education institutions

Factors	Weight of factors	Criteria	Weight of criteria	The degree of manifestation of the criteria	The degree of manifestation of the factors
Professional development of teachers of out-of-school education institutions under the program «Practice of distance learning: what, where, when and how»	0.29	Master classes on the use of information and digital tools of the distance educational process	0.47	0.75	0.190675
		Information and digital tools of the distance educational process	0.17	0.75	
		The quality of teaching the content of the program «Practice of distance learning: what, where, when and how»	0.21	0.5	
		Educational and methodological support of the program «Practice of distance learning: what, where, when and how»	0.29	0.25	
Resource orientation when choosing forms of organization of training in extracurricular education based on modern digital technologies and services	0.37	Video classes	0.41	0.75	0.21645
		Chat classes	0.17	0.25	
		Google Classroom	0.32	0.5	
		Digital interactive whiteboard	0.15	0.5	
Application of personally-oriented training of students in the educational process	0.45	Interactive learning methods	0.46	0.5	0.419625
		Trainings, master classes, individual and group projects, etc.	0.49	0.75	

of extracurricular education institutions	Online consultations	0.32	0.75	
	Communication using messengers and social networks	0.19	0.5	
Result				0.83

The model presented in Table 2 is indicative and variable, as it can be adapted to local conditions based on the specification of criteria and indicators of their manifestation. To assess the quality of the defined pedagogical conditions, we developed a qualitative model: three areas of activity of the Poltava Regional Center of Scientific and Technical Creativity of Pupil Youth of the Poltava Regional Council were singled out, which were conditionally accepted as factors. Content criteria were selected for these factors, which served as indicators of the content of the activities of each direction. In the model of our study, factors 1–3 are pedagogical conditions. The identified factors reveal following criteria:

- 1) Master classes on the use of information and digital tools of the distance educational process.
- 2) Information and digital tools of the distance educational process.
- 3) The quality of teaching the content of the program «Practice of distance learning: what, where, when and how».
- 4) Educational and methodological support of the program «Practice of distance learning: what, where, when and how».
- 5) Video classes.
- 6) Chat classes.
- 7) Google Classroom.
- 8) Digital interactive whiteboard.
- 9) Interactive learning methods.
- 10) Trainings, master classes, individual and group projects, etc.
- 11) Online consultations.
- 12) Communication using messengers and social networks.

The importance of factors and criteria was determined by the method of ranking according to the methodology of (Yelnikova, 2004) and the degree of manifestation of the criteria with the help of expert or index assessment: by calculating the index of the existing state relative to the desired state (the number of manifested requirements in the activity is related to the total number of requirements). At the same time, following established scale was used:

- 0.00 – the criterion actually has no manifestation;
- 0.25 – the criterion has a minor manifestation;
- 0.50 – the criterion is manifested within 40 %–60 % of the requirements;
- 0.75 – the criterion is manifested within 61 % – 75 % of requirements;
- 1.00 – the criterion is manifested within 76 % – 100 % of the requirements.

To determine the level of activity of the Poltava Regional Center of Scientific and Technical Creativity of School Youth of the Poltava Regional Council, which indicates the effectiveness of the developed model, following scale was used:

- up to 0.5 points – inactivity or activity does not meet the requirements of today;
- 0.5 – the level of activity is critical;
- 0.5 – 0.75 – the level of activity is acceptable (taking into account today's requirements);
- 0.75 – 1.0 – the level of activity is optimal (goes into self-development mode).

CONCLUSIONS

According to the results of the calculations, we obtained the value of the resulting indicator – 0.83 (before the experiment, this indicator was 0.41), which gives us the opportunity to state that the level of activity of the Poltava Regional Center for Scientific and Technical Creativity of Pupils of the Poltava Regional Council is optimal, that is, it did not only take into account requirements of the present, but also entered the self-development mode.

Thus, the results of the pedagogical experiment proved the effectiveness of the distance learning implementation model in out-of-school education institutions, which consists of theoretical, technological and reflective blocks, which is confirmed by qualitative modeling.

The research hypothesis was confirmed based on the center: distance learning proved to be effective when following pedagogical conditions were implemented:

- 1) professional development of teachers of out-of-school education institutions under the program «Practice of distance learning: what, where, when and how»;

- 2) resource orientation when choosing forms of organization of training in extracurricular education based on modern digital technologies and services;
- 3) application of personally-oriented training of students in the educational process of extracurricular education institutions.

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