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GAMIFICATION AS A MEANS OF DEVELOPING COOPERATIVE ABILITY DURING THE EXTRACURRICULAR ACTIVITIES OF A MIDDLE SCHOOL STUDENTS

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Introduction

Relevance of the research topic

A feature of the modern level of the information society's development is it's structuring on the principle of a network, which characteristic features are the increasing intensity, density, speed of communication links and relationships, and at the same time the increasing process of diversification, decentralization of the communicative space. The network principle of organizing information flows contributes to the generation of new knowledge as a condition for the innovative development of modern society. The more people actively, purposefully, consciously engage in communication, forming various kinds of communities, including network ones, the faster new solutions to social problems are found. Therefore, mass collaboration is a defining feature of the modern network society [150]. Today, in various spheres of human activity, the number of collaborative projects, which use crowdsourcing technologies, is growing, which makes it possible to attract a large number of people to solve urgent problems. In these conditions, one of the most sought–after skills are communicative, which contribute, on the one hand, to mutual understanding as the basis for a solidary solution of urgent problems, and, on the other, to self-identification of the individual, overcoming alienation, loneliness provoked by network, mediated, remote communication. The ability to cooperate is a communicative skill, which is one of the main skills of a person who conducts professional activity in a network society. Therefore, the development of the ability to cooperate is one of the most important goals of modern education already at the school stage, which requires the development of educational tools for the development of the ability to cooperate, taking into account the specifics of the information network society.

One of the means of developing the ability to cooperate is a communicative game, which allows you to master various ways and means of communication demanded by the network society. However, with a wide choice of various methodological developments of communicative games in the educational process, scientifically based games aimed at developing the ability to cooperate, including remotely, are not enough. In addition, the design algorithm of communicative games has not been developed that the teacher himself could use in relation to his goals. Games in collections for teachers are offered as a finished product created for a specific situation for certain tasks, and therefore it is difficult to extrapolate it to another situation. In this regard, it is necessary to develop such methods, algorithms of constructing communicative games in the educational process that would give the teacher the opportunity to apply them according to specific tasks.

Since the beginning of the 2000s, the gamification approach has been used more and more actively in various fields of activity, for example, in human ecology, marketing and others to construct a special kind of games - gamification. In education, there are examples of the application of a gamification approach to the development of various games, but there are practically no gamifications aimed at the

development of communication skills, in particular, the development of the ability to cooperate. Thus, the scientifically grounded development and testing of gamification based on the gamification approach aimed at developing the ability to cooperate is relevant for modern education.

Particulary important is the development of the ability to cooperate in adolescence, when communication plays a particularly important role in the formation of a personality, it's self-identification, in building relationships with adults and peers, in understanding life prospects. The active involvement of teenagers in Internet communication needs pedagogical support, in the development of techniques that contribute to the constructive nature of cooperation. The ability to cooperate will help a teenager overcome the difficulties of entering adulthood, and give guidance for further social, personal and professional development.

The most suitable for the use of gamification in order to develop the ability to cooperate is extracurricular activities, the resources of which are insufficiently used in the conditions of a network society. At the same time, it seems that it is extracurricular activities that make it possible to develop and use various flexible unregulated forms and methods of teaching and upbringing and vary them depending on the goals set.

Thus, in the context of the modern network society, it is relevant to develop scientifically based gamifications that contribute to the development of teenagers' communicative ability to cooperate in the process of extracurricular activities.

The theoretical basis of the study were researches on: the practice of using gamification in various spheres of human activity, theoretical aspects of the gamification approach, the structure of educational play, the peculiarities of adolescence, the organization of extracurricular activities in middle school, concepts of cooperation in education, the development of cooperation skills, communication issues in modern society, the study of the potential of the game as a means learning and development in the history of education.

A.G. Asmolov, M. Castels, M.N. Kozhevnikova, A.V. Nazarchuk, D. Tapscott, E.D. Williams, F. Heylingen, N. Galichkina, A.N. Grebnev, M.Y. Kasumova, T.N. Noskova, E.M. Sergeychik, Y.I. Kuzminov, P.S. Sorokin, I.D. Frumin.consider the main features and trends of the development of a network society in which communication is of key importance as a source of joint decisions and as a component of universal capital in their works.

The development of ideas of cooperation in education, the structure of the ability of cooperation, phases and specifics of the process of cooperation are presented in the studies of S.A.Amonashvili, N.I. Barakovskaya, O.V. Domracheva, V.K. Dyachenko, A.L.Zhuravlev, M.Y.Zaitseva, M. Kaminska, E.V. Korotaeva, Y.K. Kostenko, N.G. Nedogreeva, N.N. Peretyagina, N.I. Repina, L.S. Rimashevskaya, S.V. Salnikova, E.A. Samoylova, M.O. Tkachenko, G.A. Zukerman, A.A. Sharova. Interaction of subjects of

the educational process in modern conditions, including with an emphasis on the features of communication in a network society, the use of mobile systems in educational interaction and the information culture of subjects of the educational process are studied by S.P. Akutina, A.A. Akhayan, L.A. Vitvitskaya, A.Ya. Glazova, E.S. Zair-Bek, I.P. Ivanov, E.I. Kolesnikova, Y.L. Kolominsky, E.V. Korotaeva, V.V. Kotov, N.F.Radionova, O.N. Shilova, I.Y. Shustova, S.I. Yudakina.

The potential of extracurricular activities and leisure time as a resource for personal development in middle school is analyzed in the works of M.I. Bashmakov, E.N. Bryukhanova, I.E. Budymko, E.P. Varfolomeeva, M.A. Goryaev, A.M. Malyavina, Y.V. Rebikova, E.M. Rozhkova, A.L. Gordon, E.V. Klopov, E.M. Sergeychik, E.V. Sokolov. The peculiarities of adolescence are the object of analysis in the works of J.A. Karmanova, G. Mate, G. Newfeld, A.A. Rean, L.A.Shkutina, E. Spranger, D.B. Elkonin.

Philosophical, cultural and psychological aspects of the phenomenon of the game are considered in the works of T.A. Apinyan, M.V. Bredikhin, E. Bern, L.S. Vygotsky, D. Zitser, R. Kayua, R. Koster, S. Miller, A.V. Novikov, D. Pink, L.T. Retyunsky, E.V. Sokolov, M.Fried, V. Khalizeev, Y.. Hezinga, Y.V. Shepel, D.B. Elkonina, J. Geirland, J. Levy. The analysis of the pedagogical potential of the game is presented in the studies of N.P. Anikeva, O.S. Gazman, D. Dewey, M.G. Ermolaeva, N.V. Kazanova, P.F. Kapterev, A.S. Makarenko, M. Montessori, V. Naumov, B.P. Nikitin, V.A. Prokhorova, E.A. Reprintseva, V.N. Soroka-Rosinsky, K.D. Ushinsky, S.A. Shmakov, A.V. Shtyrov, G.P. Shchedrovitsky.

The practice of using the game in education, the functions of the game and the methodological foundations of its use were studied by R. Baden-Powell, E.N. Baryshnikov, E. Bakhotsky, F.E. Beneke, M. Besova, L. Bocharova, V.M. Bukatov, L. But Sweeney, V.V. Voskobovich, I.E. Gutman, V. Dvorkovskaya, N.L. Demkina, A.P. Ershov, S.F. Zanko, O.N. Kazak, A.L. Katkova, L.S. Kozhukhovskaya, A. Komarov, V.F. Komarov, S.A. Kuvatov, A. Kulakov, B.V. Kupriyanov, E.A. Kurenkova, Y. Merienbur, E.A. Pokrovsky, M.I. Rozhkov, L.E. Smerkovich, Y.S. Tyunnikov, S.M. Tyunnikova, A.I. Fedoseev, K. Fopel, F. Froebel, I.I. Frishman, P.L. Shilov.

The analysis of the structure of the game, it’s elements and methodological recommendations for the development and management of various types of games are presented in the works of N. Belyavskaya, M.M. Birstein, G.Zigkerman, M.G. Ermolaeva, D. Zitzer, D.N. Kavtaradze, M. Kozharinov, G.Owen, Yu.V. Pakhomov, P.Pidkasistogo, P. Prudkovsky, R.Pustovoit, V.G. Semenova, L.E. Smerkovich, E.N. Smirnova, M.V. Tendryakova, J.Haidarova, P.L.Shilova, N.N. Shut, E. Yakimova, E.Schonfeld.

The works of M.D. Bronnikov, K.Verbach, G. Zigkermann, A.V. Mogilev, I.V. Nefediev, E.Shatilova, D.Yakorev, S. Deterding, A. Dignan, D. Dixon, J.Hamari, P. Herzig, K.Huotari, R. Kahled, A. Marczewski are devoted to the consideration of the phenomenon of gamification and the application

of gamification in various spheres of human activity, K. Verbach offers a step-by-step methodology for the development of gamification.

The analysis of the theory and practice of education in middle school allowed us to identify the **contradictions** between:

- the demand for cooperation as a key competence of the network society and the rare use of scientifically developed and practically tested pedagogical means of developing the ability to cooperate in the middle school, especially remotely;

- the increased need of adolescents to communicate, including in the Internet space, and the insufficient use of scientifically developed and tested games that satisfy this need and contribute to the development of the ability of cooperation among adolescents;

- the potential of extracurricular activities in middle school in the development of the communicative ability of adolescents to cooperate and the insufficient use of extracurricular activities aimed at developing the ability to cooperate directly and remotely;

- the need of teachers to design educational communicative games aimed at developing the ability to cooperate, and the lack of scientifically based and proven in practice game modifications aimed at developing the ability of adolescents to cooperate also remotely.

These contradictions have determined **the scientific problem of the study**, which consists in the insufficiency of developed and substantiated theoretical foundations for the design and application of gamification for the development of the ability to cooperate in modern society. The definition of such foundations will allow solving one of the urgent problems of modern education related to the development of the ability to cooperate among students in middle school. This problem allowed us to formulate the research topic: **"Gamification as a means of developing cooperative ability during the extracurricular activities of middle school students".**

The goal of the study: theoretical and experimental substantiation of the use of gamification as a means of developing the ability to cooperate of middle school students in extracurricular activities.

The object of the study: the development of the ability to cooperate in middle school students.

The subject of research: gamification as a means of developing the ability to cooperate in extracurricular activities of middle school students.

The hypothesis of the study. Improving the level of development of the ability to cooperate of students in middle school is promoted by:

- using the potential of extracurricular activities as a resource for developing the ability to cooperate, taking into account the specifics of this skill in a network society;

- the use of gamification in extracurricular activities as a special communicative game, constructed on the basis of a gamification approach, which is based on the process of cooperation;

- availability of algorithm for the development of communicative educational games for certain pedagogical conditions and tasks.

Research objectives:

1. To give a meaningful description of the concept of "ability to cooperate", to determine the features of this skill in a network society, to determine criteria and indicators of the level of development of the ability to cooperate.

2. Determine the resource intensity of extracurricular activities of primary school students to develop the ability to cooperate directly and remotely.

3. Clarify the content of the concepts of "gamification" and "gamification approach" for pedagogy.

4. Identify and compare the main approaches to the design of educational games.

5. To develop an algorithmic tool for constructing communicative educational games.

6. To develop an experimental gaming educational program based on gamification, contributing to the development of the ability to cooperate, and experimentally verify the effectiveness of this program in extracurricular activities.

The methodological basis of the dissertation research is the system-activity and system-morphological approach. In the logic of the system-activity approach, the object is considered holistically as consisting of interrelated elements, and also within the framework of this approach, it is possible to study the extracurricular activities of students and the productivity of play activities in the development of the ability to cooperate. Thus, the system-activity approach allowed:

- define criteria and indicators of the level of development of the ability to cooperate and develop diagnostic tools to determine the level of development of the ability to cooperate;
- to propose a classification of approaches to the design of educational games necessary for the effective selection of one or more of them for the design of educational games for specific pedagogical tasks, including games aimed at developing the ability to cooperate directly and remotely;
- to determine the specifics of gamification as a game system with a leading non-game process.

Relying on the system-morphological approach allows for a piecemeal analysis of the object, helps to design a system that works for a specific task. The study analyzes the game as an open system, conducts a layered analysis of the rules of a communicative educational game and develops an algorithm for its construction for a specific pedagogical task.

Methods of scientific research. The solution of the tasks set and the verification of the hypothesis put forward were provided by a set of scientific research methods: theoretical — analysis of philosophical, psychological, pedagogical and scientific-methodical works on the research problem, systematization of pedagogical experience, comparison, classification, construction, morphological box

method; empirical - survey methods (questionnaire, interview, conversation), pedagogical experiment, diagnostic games, observation, quantitative and qualitative data processing, and others.

The stages of the study cover the period from 2006 to 2019:

At the first stage (from 2006 to 2012), the methodology and methodology of the study were determined, a meaningful characteristic of the concept of "ability to cooperate" was given, the specifics of the ability to cooperate in the information society were revealed, the structure of the skill, as well as criteria and indicators of its level of development. The development of gamification was carried out, within the framework of which the search was made for the most optimal forms of correlation of the game event and gamified parts of the educational program aimed at developing the ability to cooperate.

At the second stage (from 2007 to 2015), gamification was tested, data was collected on the identified criteria for the development of the ability to cooperate, approaches to the development of educational games were analyzed, the specifics of each of them and the possibility of using them for the development of games that contribute to the development of the ability to cooperate were determined.

At the third stage (2018-2023), the collected data were processed and interpreted.

The experimental base of the study was: 28 middle schools in various cities of Russia, the Republic of Belarus, the Republic of Kazakhstan. Of these, the schools of St. Petersburg - 18 schools (№№217; 394; 119; 369; 521; 335; 371; 683; 380; 91; 113; 549; 505; 466; 433; 534; 438; 527); Leningrad region - 2 schools (Toksovsky Education Center, Vsevolozhsky district and Gymnasium No. 1, Siverskaya village, Gatchina district); Kondopoga, Republic of Karelia (No. 3); Korolev, Moscow region (No. 1), Novopolotsk, Vitebsk region, Republic of Belarus (No. 12); Astana, Republic of Kazakhstan (No. 1; 2; 46;54; 28), international children and youth gatherings "Empire of Friendship" (three gatherings held in St. Petersburg, Astana (Republic of Kazakhstan) and Novopolotsk (Republic of Belarus)) and online tournaments for children of Russia, the Republic of Belarus and the Republic of Kazakhstan "Unbelievable, but a fact", organized by the International Public Foundation for the Support of Children's and Youth squad movements "Winged Unicorn". The subjects of experimental and research work were students of 70 classes of 28 schools (1400 children, students from 5th to 9th grade and 70 classroom teachers). All 1400 children became participants of the game program for the development of the ability to cooperate "My bright world". Of these, 911 people participated in the implementation of the one-year program, questioning and became subjects of observation at the stage of experimental search work; 499 people participated in the implementation of the program, questioning and became subjects of observation at the stage of experimental work in the implementation of the one-year program; 292 people participated in the implementation of two consecutive one-year programs "My Bright World" and the "Magic Country"; 57 people participated in the four-year cycle of the

implementation of three game programs "My Bright World", "Magic Land" and "Fantastic Reality". 245 teenagers participated in experimental work within the framework of the international gatherings "Empire of Friendship", 141 in online games "Incredible, but a fact".

The scientific novelty of the study is that:

- the content of the concepts of "gamification approach" and "gamification" for pedagogy is proposed;
- the specifics of the ability to cooperate for modern network societies are determined;
- criteria for determining the level of development of the ability to cooperate have been developed;
- the structure of the educational game as an open system has been developed;
- six approaches to the construction of an educational game are proposed, the possibilities of each approach for the construction of educational games for the development of the ability to cooperate of middle school students are determined;
- a matrix of the layered structure of the rules of the communicative educational game has been developed;
- the effectiveness of the use of gamification in extracurricular activities as a means of developing the ability to cooperate directly and remotely has been proven theoretically and experimentally.

The theoretical significance of the study lies in the fact that the results obtained:

- allow to enrich pedagogical theory in the field of approaches to the design, development of games used in education: 6 approaches are identified and described, the applicability of each of them to create games aimed at developing the ability to cooperate is investigated;
- reveal the potential of the gamification approach in the design of a communicative educational game aimed at developing the ability to verify the effectiveness of gamification in the development of the ability to cooperate in adolescents.

The practical significance of the study lies in the fact that its results are used in the development of game educational programs for extracurricular activities of adolescents in general education organizations based on the gamification approach:

- the developed algorithmic method of designing educational games is of interest to teachers of general education organizations, teachers of higher education, methodologists, tutors and other specialists who use game methods in their practice, has been introduced into the practice of schools in the Leningrad region, St. Petersburg, Cheboksary and Novopolotsk;
- the educational game program "My Bright World" is used in educational institutions of St. Petersburg, Leningrad region, Nursultan (Kazakhstan), Novopolotsk (Belarus) and can be conducted by school teachers after appropriate training independently;

- the network programs of online tournaments and gatherings "Incredibly, but a fact" can be used within the framework of network cooperation of educational organizations;
- heads of educational organizations, their deputies, teachers working with permanent and temporary groups can use methodological materials, games and diagnostic tools (observation diary, questionnaires, etc.) to assess the level of development of the ability to cooperate in a group and to stimulate the development of this skill.;
- an additional professional training program has been developed and is being implemented teachers (36 ac.hours) "Educational igropractic in the context of the implementation of the Federal State Educational Standard" in the IMC of the Krasnoselsky district of St. Petersburg.

The reliability and validity of the research results is ensured by: methodological validity of the initial theoretical positions; sufficiency of the source base and representativeness of the empirical base of the study; correct use of qualitative and quantitative methods corresponding to the set goals and objectives of the study; the results of experimental research and experimental work; logical consistency of the conclusions of the study; breadth of discussion of the results at different stages of the study in Russia and other countries.

Approbation and implementation of research results

The results of the study were presented at scientific and practical conferences of various levels, the topics of which were devoted to discussing various issues of the development of school education, including: *international* conferences on the development of the educational environment, as well as on the inclusion of children in the information space (2015-2016), the use of game methods in education (2013, 2014, 2015); *Russian conferences* dedicated to the use of interactive methods in education (2013, 2014, 2015, 2019); *regional* conferences on topical issues of education development (2014, 2015, 2016, 2019). The results of the study were discussed by teachers, teachers of additional education, methodologists and representatives of regional education departments at a series of *international* round tables devoted to the gamification approach to the design of educational games (2013, 2014, 2015), at *city* and *district* pedagogical seminars on communication in adolescent groups, socialization and organization of extracurricular activities in middle school (2015, 2016).

Work structure

The work includes an introduction, two chapters combining 6 paragraphs, conclusions by chapters, conclusion, a list of references numbering 322 sources in Russian and English; 19 appendices.

The content, main provisions and conclusions of the study are reflected in 18 publications (from 2013 to 2023), 5 of which are published in publications recommended by the Higher Attestation Commission for publishing the results of scientific research.

Provisions submitted for protection

1. Based on the theoretical analysis of philosophical, psychological, pedagogical, scientific and methodological works, three components of the ability to cooperate, the features of the ability to cooperate in a network society are revealed and criteria for determining the level of development of the ability to cooperate are proposed.

Three interrelated components of the ability to cooperate are identified: the cognitive-reflective component, the motivational-value component, and the communicative-activity component.

The features of the ability to cooperate in a network society are:

- *scalability* is a characteristic of the skill that allows its owner to work productively in small (3-5 people) and large (more than 30 people) groups;
- *flexibility* is a characteristic of a skill that allows its owner to work productively in groups of different ages, worldview, culture, language;
- *technical mobility* is a characteristic of a skill that allows its owner to freely use technical means of communication and constantly master new ones;
- *remoteness* is a characteristic of a skill that allows its owner to increase the share of remote communication with people living in different time zones.

The criteria for the level of development of the ability to cooperate of middle school students are:

- focus on cooperation as a value when interacting with other people;
- conscious perception and comprehension of their actions and the actions of partners in the process of jointly achieving the necessary goal;
- productivity of communication in situations of joint activity.

2. The resource intensity of extracurricular activities for the development of the ability to cooperate of primary school students lies in the possibility of maintaining stable peer groups for a long time and flexibility in the forms of organizing student activities.

Extracurricular activities can include a variety of forms of work that provide communicative experience, including distance learning, in the same group during the academic year or more.

3. The classification of approaches to the design of educational games based on the definition of the leading element in the structure of the game in its design is proposed.

Six approaches to the design of educational games have been identified:

• subject-environment approach – an approach based on the creation of a gaming environment, the development of game materials and toys for independent use by children. The main element is the means of the game;

• simulation – an approach that implements the construction of an educational game as a simplified model of real life or historical reality. The main element is the gameplay;

• improvisational approach, the leading line of which is the modeling or organizing role of the game technician; the game technician regulates the social relations arising in the game and keeps the frame of the game in accordance with its educational goals. The main element is players and game technicians;

• fantasy – an approach in which the game becomes a model of a fictional world. The main element is the legend;

• event–based - a way in which the game is a specially designed event, often conflicting, the living of this event and the resolution of the conflict leads to the transfer of the relationship of the players, their skills and competencies to a new level. The main element of the game is the non–game result;

• The gamification approach involves building a game around a basic non-gaming process, which is the main element in the design.

The choice of approach determines the range of educational tasks that a teacher can solve with the help of a constructed game.

4. The pedagogical context of the concepts of "gamification approach" and "gamification" has been clarified.

It is proposed to understand by gamification such an approach to the design of the game, in which the game is created as an add-on to the basic process. The concept of iroification is proposed to be used in two meanings: gamification is the result of the application of the gamification approach, that is, a special game designed within the framework of the gamification approach, in which the main element is the non—gaming process;

Gamification is the process of creating a game within the framework of a gamification approach.

5. The algorithm for constructing a communicative educational game is proposed.

Based on the theoretical analysis of scientific and methodological literature and generalization of pedagogical experience, 14 elements significant for the designer in the structure of a communicative educational game have been identified: time, space, non-game result, non-game process, game tools, legend, game techniques, players, gameplay, rhythm of the game, interest, technical equipment, entourage, game result.

Based on the system-morphological approach, 8 basic layers of the communicative educational game and variants of the development of game events in each of them, describing the rules of the game,

are identified. A set of 14 elements and the resulting matrix of changes in the parameters of game events – rules, that is, variants of connections between the elements of the game, allowed us to develop and test an algorithm for constructing a communicative educational game.

6. The implementation of gamification in extracurricular activities in primary school helps to increase the level of development of the ability to cooperate, including remotely.

The use of gamification in extracurricular activities of primary school students ensures a gradual increase in the level of cooperation among all its regular participants. Gamification, in which cooperation acts as a non-gaming process, is a means of developing the ability of primary school students to cooperate.

Main scientific results

The main scientific results are presented in publications in publications recommended by the Higher Attestation Commission of the Ministry of Education and Science of the Russian Federation.

1. The game is considered as an open system with 14 basic elements in its structure. A classification of approaches to game design based on the leading element in the structure of the game during its creation is proposed [Oleinik I.P. Classification of approaches to the design of educational games // Letters in Issue.Offline (The Emissia.Offline Letters): an electronic scientific journal. 2019. No. 5 (May). ART 2729. URL: http://www.emissia.org/offline/2019/2729.htm (0.35 pp.l.)];

2. An algorithm for the design and modification of educational communicative games has been developed [Oleinik I.P. Algorithm for the design and modification of collective games// Scientific opinion: scientific journal/ St. Petersburg University Consortium.-St. Petersburg, 2014. - No.8.- pp. 315-323 (0.6 pp.l.)];

3. Criteria for the formation of the ability to cooperate in accordance with the three-component structure of this skill have been developed. On the basis of these criteria, 10 indicators are identified by which the teacher-observer can assess the level of cooperation ability of the observed person. Personal contribution of at least 80% [Oleinik I.P. Gamification as a condition for the formation of the ability to cooperate among senior schoolchildren/M.G. Ermolaeva, Yu.P. Oleinik// Man and education. - 2023. - №2(75). - Pp.129-136. (0.6 pp.l./0.3 pp.l.)];

4. The effectiveness of the use of gamification for the development of the ability to cooperate of primary school students has been experimentally confirmed. The relationship between the duration of the use of gamification and the increase in the level of ability to cooperate, as well as the relationship between the level of ability to cooperate directly and remotely, has been established. The experiment was organized under the guidance of the author of the study, conducted by the author of the study and teachers acting under the guidance of the author and after learning directly from the author of the study.

All analytical calculations were carried out personally by the author of the study [Oleinik I.P. Gamification as a condition for the formation of the ability to cooperate among senior schoolchildren/M.G. Ermolaeva, I.P. Oleinik// Man and education. - 2023. - №2(75). - Pp.129-136. (0.6 pp.l./0.3 pp.l.)];

5. Based on the analysis of definitions of the concept of "gamification" in various fields of knowledge, the pedagogical context of the concept of "gamification" has been clarified [Oleinik I.P. Gamification in education: on the question of the definition of the concept// Modern problems of science and education. – 2015. – No. 3; URL: www.science-education.ru/123-20103 (0.6 pp.l.)];

6. The necessity of developing the ability to cooperate directly and remotely in a modern network society is substantiated. The possibility and effectiveness of using gamification as a means of developing the ability to cooperate under the influence of the expanding possibilities of human communication in a network society are theoretically substantiated [Oleinik I.P. Gamification of education in a network society// Bulletin of the Moscow State University. The series "Philosophical Sciences". M: IIU MGOU. - 2014,- No.4. - pp. 34-40 (0.4 pp.l.)].

Chapter 1. The theoretical foundations of the application of gamification for the development of the ability to cooperate of middle school students in the process of extracurricular activities

1.1. The ability to cooperate in a modern network society

In the Federal State Educational Standard of Basic General Education, cooperation is considered as one of the key competencies, which means the ability to work in a team and willingness to interact [224]. However, in modern pedagogy, the concept of cooperation does not have an unambiguous interpretation. For example, E.A. Samoilov considers cooperation as a competence existing along with the competence of communication, which he understands as a condition for "self-determination and the formation of a person as a person", "constructive communication using oral and written speech". Cooperation as a competence means the ability to establish trusting relationships between people, interact conflict-free and solve problems constructively, perform various roles in a group and be able to organize discussions, respect others and be tolerant of different points of view, etc. [196, p.89]. Unlike E.A. Samoylova I.A. Zimnaya considers cooperation as a competence that is part of the competencies of social interaction [74].

In our opinion, cooperation as a competence is included in the communicative competence, since the concept of communication is a broader concept than the concept of cooperation. Communicative competence, according to E.E. Dudkovskaya, assumes that in the process of forming universal educational actions, a person develops the ability to take into account the opinions of other people, is tolerant of other points of view, the ability to listen and conduct a dialogue, the ability to build productive relationships with peers and adults. As a result, a person acquires the ability to understand and evaluate the goals of the participants in the interaction, determine the essence of the problems that arise and find a joint solution to these problems. The principle of dialogicity in communication plays a central role: "Dialogue, having a social nature, realizes the fundamental human need for communication, interaction, cooperation, co-creation" [60]. Cooperation thus turns out to be one of the competencies of communication. Close to us is a position of A.V.Khutorsky, who, based on the understanding of communicative competence as knowledge of "ways of interacting with others and remote people, group work skills, possession of various social roles in a team", considers cooperation as "interaction with others" and "teamwork skills" and includes it in communicative competencies [238, 239].

From a philosophical and methodological standpoint, the analysis of the competence of cooperation is based on the understanding of communication as a fundamental characteristic of human existence. Man is a communicative dialogical being, his development and improvement are inextricably

linked with other people. The understanding of dialogue as the basis of human communication is contained in the works of M.M. Bakhtin, Y. Habermas, P. Riker and other thinkers. The meaning of communication, according to G.-G. Gadamer, is that in the process of communication, the positions of its participants are transformed, "moral and social solidarity" comes to the place of disagreements, which ceases to serve as an expression of one opinion and becomes "a common way of interpreting the world" [46, p. 48]. Thus, the purpose of communication is to achieve agreement as the basis for joint actions aimed at transforming the world and the person himself.

From a philosophical point of view, social cooperation is an effectively functioning society, i.e. a whole complex of institutions, practices, regulations that provide people not only with the opportunity for peaceful and mutually beneficial joint activities, but has a deeply moral significance – it creates a sense of moral satisfaction and even emotional satisfaction – happiness [120]. In contrast to the traditional principle of collectivism, which asserts the priority of the public over the individual, and the opposing principle of competition, which focuses on the egoistic, competitive principle in a person, cooperation presupposes free, voluntary and responsible participation of a person in joint social activities.

According to V.M. Polterovich, the reduction of the scope of state coercion due to the development and formation of cooperation institutions is the most important trend in world development. The development of modern societies is characterized by a decrease in the importance of centralized management and economic and political competition, but at the same time the role of cooperation increases – trust grows, such a moral norm as honesty is strengthened, and "collectivism and individualism in their extreme forms are replaced by a culture of constructive interaction and search for compromises" [171, p.41]. Thus, it should be emphasized that cooperation is one of the most important social values and in modern society the value of cooperation is increasing.

As modern society transforms into an information society, the intensity and diversity of communication increases in it, which is considered as a source of innovation. According to M. Castells, the source of productivity in this society is the technology of "knowledge generation, information processing and symbolic communication. ...Specific to the informational way of development is the impact of knowledge on knowledge itself as the main source of productivity" [92, pp.39-40]. The network form of the organization of communicative flows is the optimal form for the emergence of new ideas, the generation of which has a non-directional nonlinear character. The productivity of human activity in a networked society depends, on the one hand, on how much a person is able to independently make a choice from the flow of information that falls on him. In this regard, the network society forces a person to make an independent choice of his position, stimulates the process of personalization, individualization of a person, increases his responsibility for thoughts and actions, requires him to consciously understand the problems that he faces [199, p.17]. On the other hand, in a networked

society, the productivity of activity depends on the mass cooperation of people, on their ability to coordinate their goals with other people, on their willingness to accept views that differ from their own position, on their willingness to interact with others in the name of common goals. The increasing value of the creative efforts of the individual, his initiative and independence, as convincingly shown by D.Tapscott and E.D. Williams, accompanied by an increase in the importance of collective cooperation in various fields, which greatly increases the speed of finding solutions [214].

The changes taking place in modern society – its networking, digitalization significantly affect the nature of communication, the ways of transmitting information are changing, the share of remote communication is increasing, the share of media media prevails in people's communication [134]. Media, according to one of the founders of media philosophy, V.V. Savchuk, cardinally affect the architecture of communication, a new identity appears – a communicant, i.e. a person merged with the means of communication, creating a media environment [193, pp. 127 - 134]. Considering the trends in the development of the information society, D. Tapscott calls the coming and present time the era of network intelligence, rightly noting that an important aspect is the integration of human intelligence into a network [215]. The redistribution of distances, the order of occurrence and maintenance of weak and strong connections in the network establish new principles of building relationships in a network society. The principles of such a network are mass cooperation and peer production [214]. The Internet, which is the framework of network intelligence, stimulates the development of new forms of communication. A.N. Grebnev calls communication, in which the digital medium is the means of transmitting any kind of signals, electronic [53, p. 221]. Electronic communication acquires specific features. One of these features is distance, that is, separation in space and time [49]. In electronic communication, certain formats and genres are distinguished: spoken and written speech, visual signal format, audio signal without visual support, and others [93]. Remote communication requires both the development of a person's general communicative abilities and the acquisition of special skills in the use of technical means of communication, the use of media to convey ideas and emotions [152].

As a consequence of the development of electronic communication, changes in the speed of information exchange and the emergence of new knowledge as necessary conditions for human development in a networked society and the development of society itself, scientists put forward a number of requirements, one of which are certain requirements for modern education. These are the requirements for the development of a child's ability to self-determination, self-identification throughout life, the ability to build productive communication and the ability to cooperate [152]. Castels emphasizes that this requires a new pedagogy based on interactivity and the development of independent learning and thinking abilities, as well as contributing to character education. [91, pp. 315-319]. Castels draws attention to the fact that in addition to the knowledge base, it is important for a person to master a number of so-called soft skills and abilities (soft skills): communicative, creative, organizational, etc. The

specifics of communication in modern society are: the need to use communication skills in both small and large groups (scalability); frequent use of communication skills in groups of people of different ages, belonging to different cultures and having different levels of education, having a different worldview and different interests, communicating in different languages.

Thus, cooperation is one of the forms of communication, which is understood as a productive process of generating new knowledge, serving as the basis for the transformation, improvement of society and the person himself. Cooperation as an actual ability is being modified in the context of a modern network, electronic and digital society and needs to be developed by means developed by modern pedagogy.

The analysis of the concept of "cooperation" in pedagogy was carried out by researcher N.I. Repina [184]. N.I. Repina notes that cooperation as a special form of interaction is the basis for the formation of collective creativity, the achievement of equal-partner subject-subject interaction in the educational process. To build cooperation, a special organization of the educational environment and the educational process is necessary [184, p. 12].

Cooperation in pedagogical research is considered as relations of subjects [16; 138]. In the works of N.I. Barakovskaya and N.N. Peretyagina, the ways of building a relationship of cooperation in the process of any activity of subjects are investigated, as well as the main signs that the relationship of cooperation has developed.

In the last quarter of the twentieth century , the problem of educational cooperation was actively considered in the following areas: 1) implementation of collective (Y. K. Babansky, H. Y. Liimets, M. N. Skatkin, etc.) or collective-binding activities (B. T. Likhachev) and 2) organization of group or individual-pair work (K. N. Volkov, V. K. Dyachenko, G. A. Zukerman, I. M. Cheredov, etc.). Modern developments in the field of cooperation in the educational process are developing in line with the pedagogy of cooperation, which is based on the ideas of joint activity of a teacher and a student, the idea of teaching without coercion and preserving the individuality of a child, has become one of the areas of work of many innovative teachers. They were inspired by the theorists of psychological and pedagogical science: A.S. Belkin, E.V. Bondarevskaya, A.A. Verbitsky, V.V. Davydov, A.N. Leontiev, B.G. Ananyev, S.A. Amonashlvili, and practitioners: I.P. Volkov, E.N. Ilyin, S.N. Lysenkova, V.A. Sukhomlinsky, S.T. Shatsky, V.F. Shatalov et al . In our research, we continue to develop these ideas, but we focus on the joint activities of students of different ages, the teacher is involved in joint activities as an observer, organizer, mentor.

Positive results of cooperation in pedagogical research are considered:

• for the subject: expansion and strengthening of motivation for joint activities; awareness of oneself as a member of the community, their rights; development of personal reflection; becoming a subject of educational (and other) activities;

• for the group: optimization of the educational and cognitive process in the group; formation of a single value field of the group [105].

The concept of a collective subject is closely connected with the construction of cooperation relations. A. L. Zhuravlev suggests describing the subjectivity of a group by three main features: the interconnectedness of group members, joint activity and group self-reflexivity [69]. The peculiarities of the manifestations of the collective subject of educational activity in experimental situations are associated with the sociometric structure of the group and the peculiarities of the presence and functioning of microgroups in the group [99]. The presence of a collective subject in the study group, according to S. S. Kuklina, is an important and necessary condition for the development of students as subjects of educational activity [110]. As part of a collective subject, interacting individuals are united around the goals, content and value orientations of collective activity. At the same time, the interaction of students takes the form of cooperation aimed at appropriating social experience in the course of solving various educational tasks.

Cooperation as a way of interaction of subjects is actively being developed by researchers of the scientific school "Pedagogy of interactions in the educational space" by E.V. Korotaeva in Yekaterinburg [160], within the framework of the scientific school of N.F. Radionova in St. Petersburg, the issues of building interaction between teachers and students of different levels of education are being investigated [177;178; 179]. Interaction in the concept of N.F. Radionova is understood as a relationship between the actions of subjects, which assumes that the action of one side generates the action of the other side at different levels, and is also considered as a relationship of activities [177]. Interaction is a kind of meaningful exchange that requires conscious goal-setting, choice of means and constant correction [179], from which it follows that cooperation can only be conscious and regulated by the subjects of interaction.

Cooperation in pedagogy is also considered:

- as a way of organizing joint activities, work when agreeing on a common goal [249], providing for the organization, activity and independence of the actions of participants;

- as an element of the culture of participants in the educational process [89];

- as a principle of the organization of the learning environment [32];

- as a special skill and skill of the subject [38; 70].

So, based on the pedagogical studies of the content of the concept of "cooperation" analyzed above and based on the goals and objectives of our research, cooperation will be understood as productive joint activity having an equal partner subject-subject nature, assuming free, voluntary and responsible actions of each of the participating subjects. Productive activity is when it brings the planned result. Under the activity, in accordance with the theory of A.N. Leontieva, we understand the internal and external activity of a person, regulated by a conscious goal. Thus, we consider the competence of cooperation as

an activity that reflects a person's ability to choose the means and methods of solving a joint task with other people. In understanding competence as a way of activity, we follow E.V. Kharitonova and S.A. Voronov [43].

The structure of cooperation as a competence includes knowledge, experience, skill and motivation-value attitude to the results and process of activity. Skill is one of the universal elements of the cooperation structure. Following G.M. Kojaspirova and A.Y. Kojaspirov, we understand by the ability "readiness for practical and theoretical actions performed quickly, accurately, consciously, on the basis of acquired knowledge and life experience. The skill is formed through exercises and creates the possibility of performing actions not only in familiar, but also in changed conditions" [96]. Accordingly, the ability to cooperate is a willingness to build productive communication, interaction when agreeing on goals and actions to achieve these goals. The ability to cooperate is a communicative skill that helps and is necessary in building constructive interaction between several subjects in achieving a common goal, in achieving solidarity in understanding the chosen goal as a common one [65]. It is known that in an unorganized state, a group may be inferior to the results of solving some tasks even to an individual. Only taking into account the capabilities of each team member allows you to effectively and efficiently use intellectual abilities in the group [144]. One of the specifics of this skill is flexibility – the ability to apply it in groups of people of different ages, different cultures, interests, education, and worldview. In the modern network society, cooperation is carried out both directly and indirectly in conditions of remoteness in space. People living in different time zones can be included in the collaboration. Hence, the readiness for such activities is of a specific nature, remoteness becomes one of the important features of the ability to cooperate. In a networked society, the specifics of the ability to cooperate are technical literacy and technical mobility, that is, possession of means of communication and willingness to master new means as they develop rapidly.

Cooperation as a type of skill is considered in detail in the work of M.Y. Zaitseva [70]. The model of forming the skill of productive cooperation is presented in the article by Y.K.Kostenko, N.G. Nedogreeva [106]. Building productive interaction with peers and adults, the ability to take into account the position of others, integrate into a group of peers belongs to the communicative part of universal learning activities [162, pp.63-64]. In his monograph devoted to the development of the ability to cooperate in the conditions of sports and recreation classes, M.Y. Zaitseva considers three components of the ability to cooperate: cognitive, emotional-motivational and communicative-activity [70, p.33]. Teacher-researcher L.S.Rimashevskaya sees the structure of cooperation as three interrelated areas: perceptual, interactive and communicative [187]. The perceptual domain includes the perception and cognition of interacting parties with each other, as well as the establishment of mutual understanding. In the interactive area, values, ideas, meanings, knowledge, and actions are exchanged. In the communicative field, information is exchanged between the participants of the activity.

Agreeing with M.Y. Zaitseva and L.S. Rimashevskaya and clarifying these structural concepts, we will consider three components of the ability to cooperate: cognitive-reflexive, motivational-value and communicative-activity (see Figure 1).

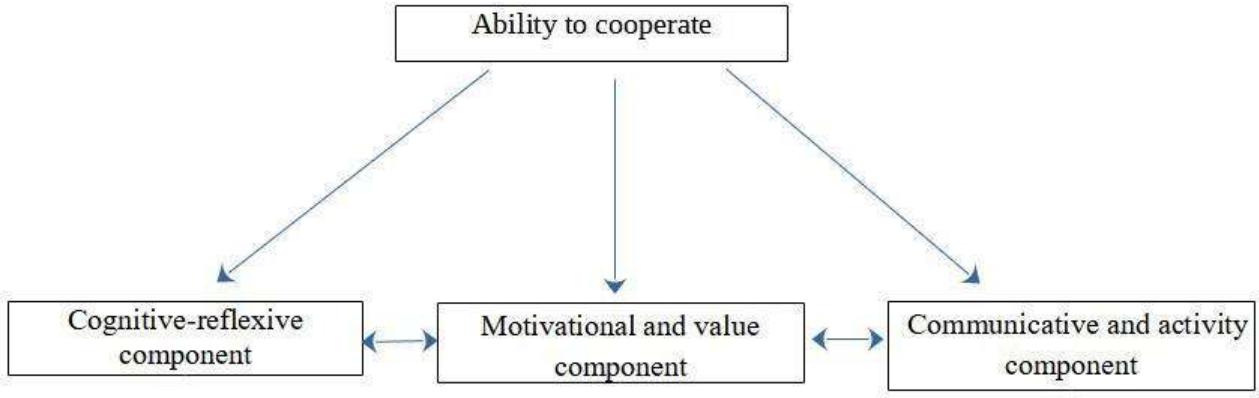


Figure 1. Components of the ability to cooperate

The cognitive-reflexive component of the ability to cooperate consists in the willingness and ability to perceive and comprehend information about oneself and others, about one's own actions and the actions of others that contribute to cooperation. This component assumes a conscious replacement of unproductive communication and productive activities by understanding the results of their actions. **The motivational and value component of the ability to cooperate** contains an incentive to interact, an emotionally colored positive attitude towards oneself and others as subjects of cooperation, the perception of cooperation as a value guideline. **The communicative and activity component of the ability to cooperate** consists in the ability to communicate and to work together with others to achieve the chosen goal. All three components are connected to each other. The identification of the components of the ability to cooperate is necessary to diagnose the level of development of the ability to cooperate, to determine the criteria and indicators of the ability to cooperate.

When considering the levels of development of the ability to cooperate, we rely on the specification of the cooperation process presented in the study by E.A. Samoilov. In it, the researcher, relying on the theory of activity of A.N. Leontiev, considers the following phases of cooperation: coordination of motives; goal-setting; orientation, distribution of roles; execution; control of the result of joint activity; correction of the result and presentation of the result [196]. The level of development of the subject's ability to cooperate directly correlates with how many phases of the cooperation process can be qualitatively implemented by him, at what stages difficulties or suboptimal actions arise.

Zero level. There is no desire and ability to cooperate, no attempts are made to communicate in line with cooperation. Cooperation cannot take place already at the stage of coordination of motives.

Low level. There is a willingness to communicate, the ability to listen to another is well developed, the ability to express their thoughts, the ability to take into account the position of the other. With the development of the ability to cooperate at a low level, coordination of motives is possible. There is an understanding of the goal, but there is no distribution of roles, responsibilities, actions to achieve the goal are chaotic, coordination of interaction is spontaneous. The goal can be achieved, but not in an optimal way, that is, with the expenditure of more efforts of participants and resources than necessary. When the time resource is limited, the goal is most often not achieved.

Medium level. At this level, the ability to plan actions, assign responsibilities, and follow a plan is added to the characteristic of a low level of ability to cooperate. Conflict situations are resolved with varying degrees of success, mutual control and self-control are carried out, the result of joint actions is monitored, mutual assistance is traced, actions can be corrected and results presented.

High level. All stages of achieving a joint result at a high level of the ability to cooperate are optimal, that is, the necessary and sufficient amount of resources is used. Emerging conflict situations are resolved by compromises, mutual consent, and a contract. It is mandatory to monitor the result of joint actions, if necessary, correction of the results is performed, the results are presented. It is important that positive emotional relationships in the group are built during joint activities.

Comparative characteristics of the levels of ability to cooperate in accordance with the phases of the cooperation process are presented in Table 1.

The level of development of the ability to cooperate can be determined by observing the behavior of the subject in situations in which it is possible to apply the ability to cooperate and achieve some visible or measurable result. In the course of the study, 10 indicators were proposed by which the level of ability to cooperate can be determined [65]. The indicators are described in the methodology for assessing the level of ability to cooperate (see Appendix 17). The development of the ability to cooperate takes place when the subject is immersed in a situation of joint activity, a situation of gaining active experience in building interaction, experience of cooperation. The experience can be both positive and negative. It is important that situations should be significant for the participant so that it is possible to motivate a person to engage in active activity.

Table 1

Comparative characteristics of the levels of the ability to cooperate

The level of ability to cooperate/phases of cooperation	**Zero level**	**Low Level**	**Medium level**	**High level**
Coordination of motives	-	+	+	+
Goal setting	-	+	+	+
Orientation, distribution of roles	-	-	+	+
Execution	-	-	±	+
Control of the result of joint activities	-	-	±	+
Correction of the result and presentation of the result	-	-	±	+

Thus, the following conclusions can be drawn. Cooperation is a productive joint activity that has an equal partner subject-subject nature, assuming free, voluntary and responsible actions of each of the participating entities. The ability to cooperate is a communicative skill that helps and is necessary in building a constructive interaction of several subjects [65]. The ability to cooperate has a three-component structure: value-motivational, cognitive-reflexive, communicative-activity components. To develop methods for diagnosing the level of development of the ability to cooperate, 4 levels of this skill are identified and characterized: zero, low, medium and high. The specifics of the ability to cooperate in modern society are: scalability – the characteristic of the ability to cooperate, allowing its owner to work productively both in small (3-5 people) and in large groups (more than 30 people); flexibility — the characteristic of the ability, allowing its owner to work productively in groups of people of different ages, culture, language, level of education who have an excellent worldview and interests; remoteness is a characteristic of the ability to cooperate, allowing its owner to interact productively with people in conditions of remoteness in space and time; technical mobility is a characteristic of the ability that determines the possibility of using technical means of communication and readiness to master new means of communication.

1.2. Extracurricular activities in middle school as an educational resource for the development of the ability to cooperate

An important factor for students to gain the experience of cooperation is what time is used for these purposes. In our opinion, the most acceptable for the development of the ability to cooperate among adolescents is extracurricular time as the most flexible in the form of organization. When receiving basic education in a middle school, the time is divided into fixed time, that is, the time during which the student is required to attend lessons at school, and after–school time - all the remaining time before and after lessons. The scheduled time in the main school takes from 30 to 40 hours a week in the period from September to May. The rest of the time, including holidays, is extracurricular. **Extracurricular time** consists of **study time**, namely, about 10 to 20 hours a week it takes to complete independent homework to prepare for lessons, also some teenagers choose additional education courses: music school, art school, advanced study courses of any school discipline and others, and **extracurricular time**. The extracurricular time of adolescents is filled with organized extracurricular activities in an educational organization and activities related to the organization of everyday life, support for the vital activity of oneself and family, as well as leisure (see Figure 2).

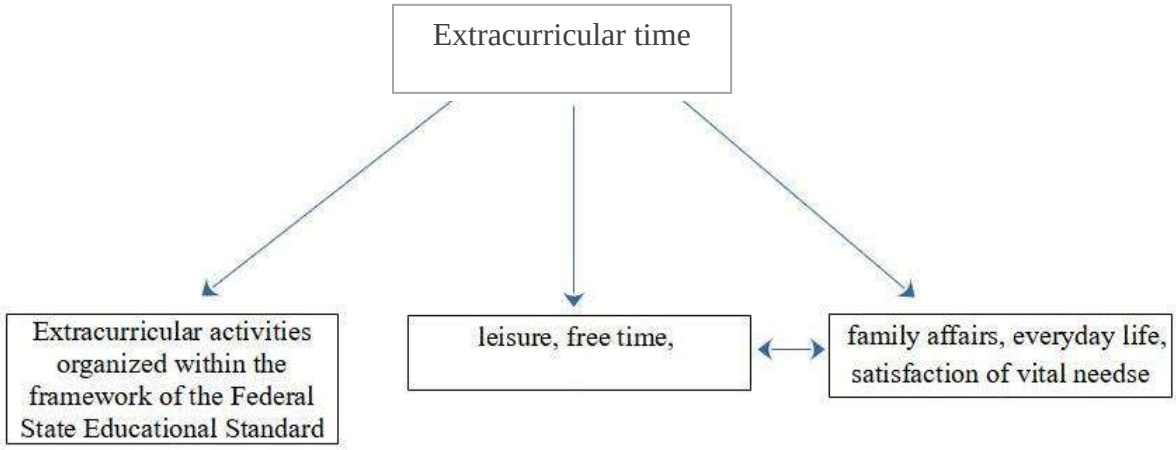


Figure 2. Extracurricular time

Organized extracurricular activities within the framework of the implementation of the Federal State Educational Standard are educational activities carried out in forms other than classroom-based. Extracurricular activities are aimed at achieving personal and meta-subject results of mastering the basic general education program. Extracurricular activities in schools are part of the educational space of the school [8]. In some educational organizations, extracurricular activities of students organized within the framework of the Federal State Educational Standard by an educational organization are mandatory for students, so it cannot be attributed to leisure. At the same time, extracurricular activity provides a person

with a fairly wide choice of forms of employment and, like leisure, is of great value to the student, since it occurs without marking control of its result.

In contrast to organized extracurricular activities, leisure is an opportunity for a person to engage in a variety of activities of his choice in his free time [23]. Leisure is what fills a person's free time in accordance with his choice. In our experience, leisure is the optimal activity for developing the ability to cooperate. In his free time, a person, without any pressure and coercion, enjoys relaxing, educating himself, communicating with friends and family, traveling, playing. Leisure is characterized by a focus on self-valuable activity, that is, an activity that interests and attracts a person more as a process than as a result. E.V. Sokolov and E.I. Dobrinskaya distinguish five levels or phases of leisure: 1) rest and movement; 2) entertainment; 3) enlightenment; 4) creativity; 5) contemplation; 6) celebration [58, p. 8]. The leisure sector in Russia is now quite commercialized for adults, children, and teenagers. Mass entertainment products consume free time and in some cases hinder the development of personality. The level of education significantly affects the quality of leisure time [199]. Please note that the leisure activities widely offered by commercial companies often involve communication between people only on everyday topics or communication as an emotional discharge about an event. In other words, the leisure of a teenager is mainly at the 1st and 2nd level according to the gradation of leisure phases proposed by E.V. Sokolov.

At the same time, adolescence is the age at which communication is the leading activity [263]. The interest in communication as a process can serve as a basis for directing the leisure activities of adolescents through communication in the direction of education and self-education. Exploring free time and reflecting on the culture of leisure, E.V. Sokolov argues that the intrinsic value of the activity to which a person aspires during leisure time is most clearly manifested if it is evaluated by a person as a game [58, p.8]. Agreeing with this observation, in our study we use the leisure resource of teenagers, offering and leaving the opportunity for them to immerse themselves in communicative games aimed at developing the ability to cooperate, not only in a special time allocated and organized by teachers, but also in their free time. Important is the culture of leisure time, which is becoming more and more for a large group of people with the ever-increasing technologization of many production processes and various services related to human life support.

The orientation of adolescents towards their peers leads to the formation of stable attachments between them. When these attachments are strong and are not connected with close adults, are not controlled by them, then complex relationships are formed, often accompanied by petty betrayals, boycotts, insults, tactless behavior, etc. [142, pp.145 – 149]. Such communication costs are more common in the leisure activities of teenagers studying at a mass middle school than among children receiving family education or engaged in self-education. Such relations, of course, do not contribute to the development of the ability to cooperate. S.A. Shmakov rightly argues that free time is not free from

education [255, p. 33]. Agreeing with him, we believe that there is a basis for directing teachers' efforts to influence the content and organization of teenagers' free time, so that teenagers' leisure does not stop only at the phase of recreation and entertainment, also necessary for a person, but also naturally passes into the phase of enlightenment, self-education, that is, we suggest paying close attention to the attention of educational organizations to the pedagogization of leisure. Pedagogization of leisure means building and structuring the environment in which a teenager's leisure takes place in accordance with educational goals, as well as reducing uncontrolled free time of a teenager.

In her research, the Russian psychologist L.I. Bozhovich emphasized that adolescence is characterized by the emergence and development of new, broader interests compared to previous ages [25, p. 37]. Her teacher, the famous psychologist L.S. Vygotsky, who was looking for explanations of internal mental processes outside the body, in its interaction with the environment, wrote about the development of value orientations in adolescence. He noted that at the beginning of adolescence (11-12 years), the development of interests is under the sign of romantic aspirations, while the end of the adolescence phase (16-18 years) is marked by a realistic and practical choice of one, the most stable interest, more often this interest is directly related to one of the life lines chosen by a teenager [45, p. 94]. In the concept of J.Piaget at the age of 11-12 and up to 14-15 years, the child is freed from attachments to specific objects in the field of perception and begins to consider the world from the point of view of how it can be changed. At this age, according to J.Piaget, the personality is finally formed, the program of the life of the individual is being built [165]. Thus, the period of human development, which falls on the basic school, is a significant period for the formation of value orientations and motivation for action in adulthood. This period is sensitive for the development of communication skills, and hence the ability to cooperate, for which it is important not only and not so much technical skills mastering a certain algorithm of action, but openness to communication with people, willingness to understand different people and the desire to interact with them, the ability to comprehend their own actions and the actions of others.

German psychologist and philosopher E. Spranger studied adolescence, developed a cultural and psychological concept of adolescence. He understands adolescence as the age of growing into culture. E. Spranger wrote that mental development is the ingrowth of the individual psyche into the objective and normative "spirit" of a given epoch [257]. We are talking about inculturation – the development by a teenager of the cultural values of the society in which he lives. In the context of globalization, when the mobility of the population increases, when migration processes become more active, there is an intensive interaction of representatives of different cultures, whose values may differ significantly. These differences can result in rejection of a different value system from one's own and lead to conflict situations. Therefore, the task of forming and developing intercultural, including interfaith tolerance among adolescents becomes very important for the pedagogical community, as modern teachers-

researchers L.A. Shkutina L.A. write about. and J.A. Karmanova [253]. Thus, the development of a teenager's personality in conditions of cultural pluralism requires the development of communication skills, the ability to cooperate.

Thus, adolescence is an important stage in the formation of personal value orientations, for the development of the ability to cooperate, orientation to positive interaction with other people is necessary. The period of study in middle school falls precisely on adolescence: from 11 to 15 years.

The pedagogization of leisure time can be an important resource for the development of the ability to cooperate among adolescents, if the activity is perceived as valuable and fascinating. Such a valuable and exciting activity for teenagers can be a game. At the same time, for the development of the ability to cooperate, it is important to maintain a permanent group for a long period: from several months to a year. It is optimal if peers are included in the group for the development of the ability to cooperate, that is, people close in age, and people of other ages, as well as people with diverse interests, culture, not only being friends. Important for the development of the ability to cooperate is the size of the group – it should be sufficient to preserve the diversity of the composition: 15-30 people or more. Also, attention should be paid to the initial motivation for inclusion in activities related to the development of the ability to cooperate. In leisure time, when a teenager makes a free choice in communication and activity, the fulfillment of the above conditions is extremely difficult at the beginning of work on the ability to cooperate.

At the same time, leisure time naturally includes activities related to the development of the ability to cooperate at a non-starting stage, when teenagers have already received sufficient motivation for such activities as part of certain groups. Therefore, we drew attention to organized extracurricular activities, in which students are often included during the school year by a permanent group of peers – a class or part of it. Extracurricular activities are organized in forms other than regular, it is possible to organize extracurricular activities within the framework of networking and with flexible use of the student's extracurricular time. It is important that communication skills are declared as one of the priorities when planning the results of extracurricular programs [168].

Communication programs can be naturally interwoven by the way of organization into the educational process of schools. It should be especially noted that some extracurricular educational programs that can be included in the process of a child's leisure activities have the most favorable effect on his motivation for development. Compulsory education, which often meets resistance [98], receives additional motivational reinforcement for the child by a non-standard form of organization that merges educational activities with leisure. We agree with the statement of M.N. Kozhevnikova, a researcher in the field of philosophy of education, that the culture of communication can develop both in the regular and extracurricular activities of students at school, and in various types of informal and additional

education [52, p.46]. It should be noted that cooperation as an element of the culture of communication significantly expands the possibilities of a person in his self-development.

In modern society, distance learning, as well as distance professional activity, is spreading more and more. At the same time, the ability to collaborate remotely naturally becomes in demand. The inclusion of teenagers in remote cooperation – with peers from different cities in extracurricular time allows you to work on the development of independence, self-organization and self-education. The experience gained is also implemented by teenagers in educational activities. The issues of the development of social activity of adolescents in extracurricular time on the basis of information and communication technologies are actively discussed by teachers [220]. Social activity, communication and cooperation during extracurricular time have a positive effect on a teenager's self-esteem. Both in the conditions of distance learning and professional activity, and in the conditions of direct communication, a person's social activity is an important component of his life. The ability to maintain such activity, the ability to cooperate with peers face-to-face and remotely becomes one of the conditions for a high quality of life.

The effectiveness of distance learning largely depends on the ability to structure information independently [115]. With both face-to-face and remote cooperation, the ability to structure the flow of communication develops, which becomes nonlinear in a group of more than three people. Remote cooperation allows you to work on structuring communication using technical means. During extracurricular hours, when there are no strict time limits for targeted communication, and it mixes with everyday, emotional, the development of communication structuring skills occurs spontaneously and naturally. The ability to structure information and communication activities significantly increases the productivity of communication, which leads to the development of the ability to cooperate. The experience gained during extracurricular time is easily transferred to school time. The reverse transfer is difficult. With educational cooperation within the framework of lessons, the very atmosphere of the lesson does not allow communication to become nonlinear. All communication is centered around the task being solved and is carried out most often under the supervision of a teacher, even if not directed by them. It is also necessary to structure communication in educational situations in the classroom, but this is easy structuring, since the very information, offered by communicants in educational situations under the supervision of a teacher, is almost all related to the task being solved. During extracurricular time, a teenager is forced, on the one hand, to deal with a lot of interference: solving everyday tasks, parallel communication flows that are not related to the task being solved, emotional statements, solving tasks related to self-organization, prioritizing communication and agreements. This brings the ability to divide, isolate, distribute, structure, plan and self-organize to a higher level. But on the other hand, a teenager gets more time for the process of structuring information and can pay more attention to it.

When choosing the subject of our research – the search for means of developing the ability to cooperate, our attention was drawn to games. According to the figurative expression of D.B. Elkonin, the game can be a means of acquiring skills and skills of organizing cooperation, the effectiveness of the game in this direction is due to the combination of gaming activity and cognitive interest within the framework of one activity [262]. S.A. Shmakov calls the game the main sphere of communication. Studying the games of children, he came to the conclusion that it is in the game that the experience of human relationships, social experience is acquired and learned [255, p.28]. The game is a method of cognition of reality, guided by internal forces and allowing a teenager to master the initial, but very extensive foundations of human culture in a short time [181, p. 106]. We also paid attention to the game because of the possibility of using it as a motivator and activator of forces. When immersed in the game, a person is in a state in which he uses his skills to the limit of his capabilities, which means he develops and consolidates them. This state was described by the Hungarian psychologist M. Csikszentmihai, calling it a flow state. Being in a state of flow means using all your skills to the full, being fully engaged and involved in some process [271]. Thus, being carried away by the gameplay, a teenager, unnoticed by himself, with pleasant efforts for him, acquires skills that, with another way of organizing activities, he would not waste time, would consider them unnecessary or unworthy of special attention. For example, the ability of independent activity with the presentation of results to others, the ability of self-organization in communication and cooperation in a remote format, the ability to plan and follow a plan, to be responsible for decisions made to yourself and others.

Thus, extracurricular time, which teenagers have filled with organized extracurricular activities and leisure time, is the most suitable for working on the development of the ability to cooperate. This time is less fragmented, more extended, which makes it possible to use long time intervals for the natural formation of the ability to communicate productively, the ability to structure information flows, the ability to independently plan activities, follow a plan, self–organize - that is, the development of the ability to cooperate. Extracurricular activities are most convenient for starting work on the development of the ability to cooperate, since teenagers participate in such organized activities as part of permanent groups during the school year. Further, it is optimal to use leisure time for productive development.

1.3. Communicative educational game as a means of developing the ability to cooperate

1.3.1. The structure of the communicative educational game

The game is a complex phenomenon that is present in all cultures, at all stages of human life and each individual. A huge amount of material has been accumulated in science, which demonstrates the polysemanticism, multidimensionality, and multifunctionality of the game. The game has been studied to the greatest extent in philosophy, psychology, ethnography, cultural studies, pedagogy [150].

Currently, the point of view has been established in science, according to which it is not possible to create a universal theory of the game or to give a universal definition of the game. The game is being considered: 1)as a metaphor (rhythmic repetition of any movement not related to a specific purpose) [264]; 2) as an explication, that is, a structure-forming principle, a means of organizing material, a method of constructing philosophical, artistic, musical or other works [11, p. 10, p. 46]; 3) as a principle of world relations and life-building, which can result in a form of cultural nihilism, where the game principle has a self-sufficient character [186]; 4) as an activity from children's games to adult games [12]; 5) a process in which two or more parties are involved, fighting for the realization of their interests [158]; 6) as a rigid regulatory system [225]; 7) as a transaction with a hidden purpose [21].

For the purposes of our research, relying on the definition of the game by T.A. Apinyan and on the philosophical and mathematical definition of the game as a system, we will understand the game as a system developed, constructed by a person or a group of people, involving a person in a certain type of activity. A communicative game is a game involving participants in the communication process. As game developers and researchers, we are interested in communication, leading to a certain described activity result, that is, not communication for the sake of the process itself, but for the sake of achieving a certain game goal. Therefore, we will consider just such communicative games. While for the participants of the games, the game process itself should remain an attractive, fascinating activity. For us, the educational component of communicative games is also important, that is, the predicted result of the game as changes in the internal, personal plan of the participants of the game after its completion. Such changes can be the acquisition and comprehension of the communication experience. A person's personal experience is an important aspect in the development of communication skills, it is possible to develop the ability to build communication only by receiving such a positive or negative experience. A communicative game is a game that gives such an experience. Games in which the educational result is a priority are called educational in the scientific and pedagogical literature [228; 28;173; 127]..

Thus, communicative educational games are specially designed games that create conditions for gaining experience in building constructive interaction, experience of different types of communication, experience of joint activities, experience of cooperation in joint activities in small and large groups [143].

Further, the paper describes the specifics of games aimed at developing the ability to cooperate. The next paragraph of this paragraph presents the structural elements of the communicative game used in the educational process. The allocation of structural elements is necessary for the systematization of approaches to the design of games and the selection of the most effective for the development of the ability to cooperate in extracurricular activities of middle school students.

To identify the essential characteristics of a communicative game that are necessary for its construction, we follow a systematic approach. Namely, we define the elements, highlight the relationships between the elements, consider the relationship of the game with other systems and the necessary conditions for its functioning. First, let's highlight the elements inherent in any educational game – the basic elements. Then we will define additional elements that are present in the structure of the communicative educational game. The structure of the communicative educational game is presented in the article by the author of the research [143].

Basic elements of an educational game

Educators and game researchers, describing their understanding and functions of the game, identify individual elements.

For all types of games, **time** and **space** are necessary elements, as characteristics delineating or limiting the game circle mentioned by J. Huizinga [235, p.34, p.280-281]. The famous gamer R. Kayua calls the game isolated, that is, limited in space and time by precise and predetermined limits. [87, p.176] L.T. Retyunskikh calls the area of the game a separate closed space [186, p.47]. The need for a "clear and understandable framework of the game" is indicated by teachers D. and N. Zitsera when describing the game as the main method of informal education [76, p. 84-85], also mentioning space and rules. M.G.Ermolaeva, a researcher and practitioner of the game, calls the game chronotope, which includes space and time, one of the main constants of the game [64, p. 20]. The organization of space among theorists and practitioners of role-playing and board games of the Kazan Gamepractice Center is called the preparation of a game polygon. They call the polygon of the game a set of playing places. For a board game, a polygon is a playing field placed on any horizontal surface. The choice of space for them is also one of the grounds for dividing role–playing games into salon (pavilion, cabinet) – indoor games, and off-site games on the ground [192, p.12]. D. and N. Zitsery write that it is necessary to "enter into an alliance" with space" in order to so that the space serves as a tool. They note that the space, by creating a certain atmosphere, can already influence the content of the game and any educational action taking place in it. They devote a separate article to the organization and use of space [76, pp. 147 - 148]. In his methodology for organizing and conducting the game, S.A. Shmakov calls the space a game place [255, pp. 205-211]. N.N. Shut, devoting a chapter to the organization of the game space in his book "The

Magic Keys of the Gamemaster", delimits the space during the preparation and conduct of the game into two components: the playing field and the playing area. The game area, according to N.N.Shut, is a theater of game actions, where all game actions take place, all players and possible spectators are placed [259, pp. 54-56]. He also draws attention to the time limit of the game, which is determined by the physiological and psychological norms and needs of the participants, as well as technological limitations and externally set boundaries [ibidem, pp. 59-61].

D.N. Kavtaradze, a theorist and practitioner of active teaching methods in modern education, devotes part of his research to time as the most limited human resource and its most effective use in the game as a mechanism for transferring experience. He compares the efficiency of time use in combination with the level of security in such mechanisms as instinct, imprinting, training, education, and play [83, pp. 6-7]. He also talks about preparing the room for the game, emphasizing that cramped space is better than excess [ibidem, p. 78]. The temporality or finiteness of the gameplay is, according to L.T. Retyunsky, one of the formal signs of the game [186, p.5]. The chronostructure of the game is examined in detail by E.N. Smirnov, paying attention to the fact that time can be felt differently in the game and the exit of the participants from the game is a more difficult task for the presenter, than an introduction to the game [208; 209].

Thus, we distinguish two elements in the structure of the game inherent in any educational game:

1. game time is the period of time between the beginning and the end of the game, which can be divided into parts, during this time the gameplay takes place, game actions are carried out;

2. game space — each game takes place in some limited space. This space is outlined either by some kind of game things or negotiated, or mentally presented. The game space quite often requires a special organization: the arrangement of furniture, the preparation of the playing field, the allocation of special zones, playing places in the space.

Naturally, we will name **the players** as the main element. People who voluntarily accept the rules of the game become players and start the functioning of the game. Players are the people for whom every educational game is conceived.

Thus, we highlight the third element:

3. players are people who freely accepted the rules of the game and started the game according to these rules.

There are three elements that we can distinguish, and in one form or another are found in various educational games: entourage, means of the game, equipment of the game.

The entourage that supports and creates the atmosphere of a particular game world is singled out as a significant component of games by the creators of role-playing and table games [135, p. 22] and free improvisational games [18]. The entourage of games includes decorations, costumes, musical accompaniment, furniture and others. N.N.Shut combines the means of the game and the entourage, calls

everything together – game props or game objects [259; p.23], notes that anything can be game objects, but imposes a number of requirements on them [ibidem, p. 29]:

- relevance,
- compliance with the age and psychological characteristics of the participants of the game,
- environmental cleanliness and safety,
- aesthetics, attractiveness, brightness,
- sufficient size and volume,
- versatility,
- convenience, transportability, effectiveness.

M.G. Ermolaeva calls game props one of the necessary components of the game [64, p.20]. S.A. Shmakov also writes about the ornament of the game: music, game gestures, chants, props, costumes – a mandatory, but not a constituent feature of the game [255, p.92].

Thus we identufy the following three elements:

4. game entourage — a set of environmental conditions that immerse players in the game. The entourage can be replaced or removed altogether, the basic gameplay, the game result and the non-game result will remain unchanged. The entourage in the game is needed to attract and engage players, to maintain the legend of the game, to engage in the game and keep in it.

Work on the entourage is work on the aesthetics of the game, on a set of artistic forms that affect all the senses of the player: visual images, speech specifics, smells, sounds, tactile sensations [128]. Sometimes the game does not require costumes or decorations, but a general quiet and calm environment is important for its conduct, allowing you to concentrate, which we will also call an entourage. Most often these are abstract board games, for example, "Chess" or "Pentago".

5. technical equipment — a necessary set of technical means for gaming activities, depending on the availability of one or another technical equipment, the basic gameplay, game and non-game results and all the basic elements do not change. For example, if there is a projector, the current level of players can be displayed on the screen, and in its absence, they are announced or written out on the board, whatman, asphalt.

The absence of any technical means can lead to the impossibility of playing a game, as for example in the game "Cost of Living" [129].

6. the means of the game are the means by which or with the help of which the game activity is carried out. They cannot be removed from the game, in their absence the game will not take place. Game means can be material, informational, linguistic, logical, mathematical [97, p. 447 — 450].

What can be called the outcome of the game, meaningful only within the game – we will call the game result. Game researcher M.G. Ermolaeva determines the result of the game as "the greatest result of game actions achieved by players according to all the rules" [64, p. 20]. The game result can be:

• rating of players based on their personal or team achievements, for example, the Olympic Games;

• achievement of the player's personal goal. For example, A.Komarov's situational-activity game "Marketing of communication services" [308, pp. 14-15] or A. Kholodilov's plot-role-playing game "Metro" [303];

• some kind of intellectual or visual product. For example, organizational and activity games [159, pp. 24-28], the word game "Chain of Words", known in children's folklore as "Make a molehill out of a molehill" or a narrative game for creating joint stories, for example, "Microscope";

• the completion of a case, for example, in the folk game "Trickle", the completion of the order;

other results that are significant inside the game space are also possible.

N.N.Shut, presenting the game in the form of a crystal in the form of a quadrangular pyramid, calls winning the top – the main result of the game. He calls the gain a real or imaginary acquisition, as well as some achievement or advantage [259, p. 24, p. 33-35].

Thus, we highlight the seventh element of the educational game:

7. the game result is the result of the game, significant within the game itself.

In this paragraph, seven mandatory elements of the game used for educational purposes are highlighted: game time, game space, players, entourage, means of the game, technical equipment of the game, game result. The described 7 elements can be distinguished in any educational game. The next paragraph presents 7 more elements that can also be distinguished in almost any educational game, but for a communicative game they have their own specifics.

Additional elements of a communicative educational game

The additional elements presented in this paragraph are also found in other types of games, but for the construction of a communicative educational game they are necessary and have specifics.

Separately, we will highlight an element that we will call the **basic gameplay**. This is a game process that is carried out according to the rules of the game, and in which participants who voluntarily enter the game are involved. The gameplay involves the activity of participants, the implementation of gaming activities that do not matter outside the game. This process is described by all authors representing specific scenarios of the game [22; 85; 169]. N.N.Shut, a game researcher, separately identifies game actions, player operations as a way to achieve goals [259, p. 23]. The basic gameplay is usually described by folklore game collectors or methodologists under the heading "the course of the game". There may be several processes in the game, for example, resource extraction for the construction of a city, a competition within the residents of the city for the title of governor and a competition between cities for the title of "City of Dreams", an eventful carnival may take place inside each city or military clashes between some groups formed from residents of different cities.

We will call the basic game process the one in the course and according to the results of which the winner of the game is determined or the level of success in the game is determined. L.T.Retyunskikh calls game activity, game relationships and game consciousness the most important elements of the structure of the game [186, p. 9]. Moreover, gaming activity is understood as a set of actions during the game, gaming consciousness is understood as a set of "intellectual-volitional and emotional-sensory reflections of the subject", and gaming relationships are considered as interactive interaction of subjects during the game [186, p. 10].

The eighth element in the structure of a communicative educational game:

8. basic gameplay – a set of game actions, during and according to the results of which the game result is determined. For a communicative game, it is important that the basic gameplay is communication, the main part of game communication occurs about and in order to achieve a game result.

One of the components of the game is the plot, an imaginary situation. Researcher and teacher S.A. Shmakov separates these two components. An imaginary situation is a plan, a fiction, an idea, the main invention of the game. The plot is a symbolic reflection of any realities being played out [255, pp. 77-79]. In the methodological developments of teachers, there is the concept of a "legend" of a game, which includes a description of both the plot and an imaginary situation, or which precedes the "twisting" of the plot. E.N. also writes about the game context, which is essentially a legend of the game, contrasting with the world outside of the game. Smirnov [208, pp. 14-28].

We highlight the ninth element:

9. The legend of the game is a text that introduces players to the world of the game and explains the processes taking place in this world, a text that reveals the storylines of the game. We understand the text here as the presentation of information in any form, not only in written text. Perhaps narrated or presented with the help of visual images, theatrical sketches, some kind of game action and other suitable for a particular game in a way.

R. Kayua also notes that the game is primarily free, that is, it cannot be made mandatory for the player. The person entering the game (the player) voluntarily accepts the rules and acts in accordance with them. In educational games, this game circle does not arise spontaneously, but is constructed from the outside and often with the help of additionally involved people in maintaining the boundaries of this circle. Such people are called:

- gaming equipment (Shchedrovitsky G.P., Pakhomov Yu.V.) [260; 159];
- master of the game (Shilov P.L.; Smerkovich L.E.; Zabirov D.D., Lensky A., Molodykh V.) [128; 117; 192; 230];
- gamemaster (N.N. Shut) [259, pp. 41-51]. N.N. Shut considers game technology as one of the intermediate stages of the development of a gamemaster;

- moderator (Zitser D., Zitser N., Kupriyanov, B.V., Bukatov V.M., Ershova A.P.; Kuvvatov S.A.) [76; 31;113]. The host of the game brings together all the elements of the game and controls the energy of the game [76, p.165];
- organizer of the game (Frishman I.I.) [181, p. 107];
- a teacher with a playing position (Makarenko A.S.) [122, pp. 211-214];
- master of game pedagogy (Zinchenko A.P.) [75, p.11];
- teacher-game technician (Zemtsov D.I., Lobacheva A.P.) [72];
- judge, referee, referee (Pidkasisty P., Haidarov Zh., sports games) [166, p. 14; 206].

V.M. Bukatov writes about how important it is to be able to play the game, about the consequences of teachers' gaming mistakes [32, pp. 9-10]. In the book "Pedagogical Mysteries of Didactic Games" he notes that playing a game is a special art that a teacher should master. Researcher and practitioner of the game S.A. Shmakov, confirms the need to allocate a special meaningful role to the person leading the game, and says that the game is primarily necessary for the educator to play himself [254, p.62].

The people who organize, conduct the game, support the implementation of the rules, resolve game conflicts, sometimes not provided for by the rules, keep the educational goals of the game and, if necessary, direct its course, monitor the rhythm of the game, we will call game technicians. An important duty of a game technician in communicative educational games is the regulation and monitoring of game communication. Communicative educational games assume the presence of game technicians as a necessary element. Game technicians can be players at the same time. Thus, we select the following element:

10. game technicians – people who launch, lead, regulate and support the game.

For a communicative group game used for educational purposes, key events are important. The key events in the game are events that must necessarily take place during the natural course of the game or when performing special actions of the organizers of the game, - the researcher, game developer P.L. Shilov draws attention to this [192, p.11]. When planning a game, the game technician places its key events on the time axis, that is, determines at what point in the game time they should take place. Thus, the game technician forms the rhythm of the game. Confirmation of the need to split the entire time period of the game into some subperiods is found in the work of the theorist, researcher of educational processes and methodologist A.M. Novikov. Talking about the time structure of the game, he calls the game action the unit of the game, considers the phases of the game, thereby outlining the general time rhythm for educational games [141, pp. 450-452].

We select the eleventh element:

11. the rhythm of the game is the organization of game activity in time, the division of game time into game events, the allocation of key events of the game. The rhythm of the game can be supported by a person who is not involved in the game itself as a player, that is, a game technician.

The possibility of gaming activity is one of the properties of the game, that is, a necessary condition. However, performing game actions is not a sign of the game. So, an adult playing hide-and-seek with a small child does not actually play hide-and-seek himself, but only performs game actions. Interest is the trigger for the start of the game. It is necessary precisely for the players to play, and not just perform game actions. A.I. Fedoseev writes about the importance of all players being immersed in the game, their responsibility and the level of dedication in the game [223]. One of the articles in the book "ABC NO" by D. and N. Zitsery is devoted to personal interest as the basis and the main motor. They are sure that the interest appears as a result of the participant's interaction with the atmosphere and there is no effort on the part of the organizers of the game. But it can appear only in conditions that are comfortable for a person [76, pp.110-115]. V.M. Bukatov writes about the game motivations of students when repeating didactic games, about the need for secrecy in the game and self-complication of the game by the child as he grows up [32, pp.12-13].

Considering the hierarchy of needs of the game character, the player and comparing it with the hierarchy of human needs according to A.Maslow, M.Fried in the work "Motivation of behavior in role-playing games", notes that the game model should not contradict the possibilities of self-expression, success and communication of the character, that is, the most important needs of the player. What is at the top of A. Maslow's pyramid for a person, in a similar pyramid for a game character is the foundation, that is, the middle needs. The game, according to M. Fried, in that case will live when the goals of the character are realistic inside the game and justified. That is, the interest in the works of M.Fried is considered from the point of view of meeting the needs of the player and the character [230]. In-game and out-of-game aspects of enjoying games of any type are considered by A.Lensky and his co-authors P. Prudkovsky, E.Yakimova and N. Belyavskaya. Getting pleasure by the participants, in their opinion, is the main goal with which people start and continue to play [117].

In search of an element that keeps the player inside the game, the American game designer R.Koster created a theory of fun, getting pleasure, joy from the game, interest in the process, and also considered various aspects of this phenomenon and ways to achieve it by means of the game [298]. What engages and keeps participants in the game, pushes them to active game actions, is studied in psychology, pedagogy, culturology and sociology. We have met a description of this phenomenon under the names:

-motive (M. Fried, V.M. Bukatov) [32; 230];

-fan (R. Koster) [297];

- drive (D. Pink) [167];

-interest and support of its 4 components (G. Zickermann, L.T. Retyunskikh)[73, c. 189 – 190; 186];

- pleasure (A.Lensky, P.Prudkovsky, E.Yakimova, N.Belyavskaya [117].

Note that when describing these phenomena, researchers have similar aspects. The presence of interest, as one of the most important motivational grounds of the game, is also noted by the researcher of the game L.T. Retyunskikh. Interest is one of the existential signs of the game [186, p. 6].

Thus, we select the twelfth element:

12. interest – attention, curiosity, direction of thought and action. Interest is not the only element that researchers attribute to the group of elements concerning the inner nature or atmosphere of the game. But we highlight interest as an important element for the designers of the game to think through, important for the developed game to work as a system.

After the system is shut down, players and game technicians leave the system. The changed state of the players after the completion of the functioning of the system will be called a non-game result, and the process that was carried out by the player or players during the game, which has not only and not so much game value, will be called a non-game process. The non-game result and the non-game process may not be realized and comprehended by the participants of the game. To translate a non–game result into a life experience, a special stage is required - reflection or post-game discussion, organized and conducted by a teacher. Researchers of organizational-activity games write that the whole process of the game can be divided into the actual game (workflow) and reflection, discussion [260].

L.T. Retyunskikh notes that there are some moments of experience and awareness of what is happening, which the player interprets as gaming. In particular, during the game, the subject consciously doubles the world, assuming that the game is recognized as a second plane of being, an additional one, that is, the first plane of being is necessarily present – the real one [186, p.6]. The non-game process and the non-game result lie within the boundaries of the first plane of being. V.A. Sukhomlinsky wrote about the importance of reflection, comprehension of his actions: "I have been thinking for more than one year: what is the most pronounced result of education? When do I have the moral right to say: have my efforts borne fruit? Life has convinced me that the first and most tangible result of education is expressed in the fact that a person began to think about himself. I thought about the question: what is good about me and what is bad? The most sophisticated methods and techniques of education remain empty if they do not lead to a person looking at himself, thinking about his own fate" [213, p. 29].

The process of obtaining the necessary knowledge, skills, and skills in the case of using an educational game can be divided into two components: directly during the game and within the framework of activities on the "occasion of the game", for example, during discussions of various situations and "vicissitudes after it" [181, p. 107].

Thus, we distinguish two more elements in the "communicative game" system:

13. non-gaming process;

14. non-game result, which in educational games is an educational result.

This pair of elements sets the characteristic of the game, which is important for non-game, pre-game and post-game eventfulness, these two elements determine the educational component of the communicative game: non-game process, non-game result. The non-game result may be different for the same player depending on the ability to reflect and on the presence of this stage in the post-game period.

The listed 14 elements are the necessary minimum that sets the meaningful work of a teacher with an educational communicative game as a presenter and/or developer.

Depending on the features of the considered or developed communicative games, the set of components may expand. That is, this set of characteristics is a minimal list and is open for addition in each specific case. For example, the following elements-characteristics can be additionally distinguished : **progress scale** (where and how the progress of the game is reflected, intermediate game results; in what format the progress scale is available to players, game technicians), **variability** (what can be changed by game technicians during the game; what game technicians influence by their actions; what events can take place under the influence of players, how to prepare for them for game technicians), **continuation** - the conditions necessary for the continuation or repetition of the game. There may be other additions that are determined when designing the game.

In a communicative game, the basic gameplay, closely related to the gameplay and directly affecting the game and non-game results, is communication. The main non-gaming result of communicative educational games is the development of communicative skills: the ability to build one's speech orally and/or in writing, understandable to other people; the ability to negotiate; the ability to build constructive interaction; the ability to cooperate.

1.3.2. Features of the constructing of the rules of a communicative educational game

The rules of the game are one of the main components of the game, the connecting links that collect all the structural elements in the system. The rules of the game reflect its essence and the ratio of all its components [255, p.80]. All the elements listed in the previous paragraph form a game only in relation to each other. There is no game without rules. "In games without rules, you need to know the rules especially carefully," these words of actor A.V. Samoylenko have become popular among practitioners and researchers of the game. The rules of the game are unshakable, they can be varied, but they cannot be changed, says the culturologist Y. Huizinga [235, p.281]. The game establishes the order, M.Fried confirms [230, p.35]. P.I. Pidkasisty and J.S. Haidarov call the basic rule of the game the most important element of all artificial human games [166, p. 66].

The most developed typology of the rules of the game is the typology proposed by J. Coleman [cit.by 141]. It notes five types of rules:

— procedural rules describing how the game is played;

— rules for limiting the behavior of players;

— rules for determining the goal, describing the goal of the game and the means to achieve it;

— environment reaction rules describing the processes taking place in the environment, assuming that the environment is represented as part of the game;

— police rules describing the consequences of a player violating certain rules of the game.

Three levels of rules are distinguished by R.Pustovoit, researcher and practitioner of role-playing games, in the article "Designing the rules of role-playing games". He calls the rules of the first level the rules described by the developers of the game for players. The rules of the second level are not fixed in writing, but the habitual behavior of experienced players, which may imply a violation of the rules of the first level, if it does not violate the course of the game. The rules of the third level presuppose behavior outside the game, preparation for it [175].

It is the rules of the game that determine the nature of the relationships built by the participants in the game, and therefore directly affect the experience. We are interested in getting the experience of cooperation during the game, which means that the construction of rules is of particular value. It is important that the rules do not determine the result of the game [259, p. 25], meaning the game result: winning, rating, final score. Based on the rules, game conflicts are resolved, they are referred to as laws when making decisions during the game [192, p.12]. The game exists and is supported by the participants' desire to comply with the rules [87, p. 35]. In games in which the basic gameplay is imitation, improvisational performance of a role, everything is equal that fulfills the role of rules: fictitious behavior or "make–believe" behavior [ibid., p. 47].

The construction of the rules of communicative educational games determines the special attitude of the methodologist-developer to the allocation of the communication process. To determine the type and nature of the relationship between the elements of the game, to construct such relationships, and hence the rules, a system-morphological approach is applied in the game being developed or modified, namely the morphological box method proposed by American astronomer F. Zwicky and used by engineers to solve inventive problems.

The following stages are highlighted in the method [218]:

1. Precisely formulate the problem to be solved.
2. Identify and characterize all the parameters that could be included in the solution of a given problem.
3. Construct a morphological box or a multidimensional matrix containing all solutions to a given problem.
4. All the solutions contained in the morphological box should be carefully analyzed and evaluated in terms of the goals to be achieved.
5. Choose and implement the best solutions (subject to the availability of the necessary funds).

The algorithm for constructing and modifying group games based on this method is described in detail in the corresponding article of the author of the study [147]. By performing the proposed actions at each of these stages, it is possible to solve the problem of analyzing and constructing the rules of a communicative educational game. Let's highlight the parameters that affect the construction of the rules of the game. To do this, let us turn to the classification of mathematical game models presented in game theory [158; 164] and to the dynamic classification of games made by V.G. Semenov [198]. Let's call these parameters "layers of the game", which metaphorically reflects the essence of the logical operation of analyzing game rules – "layering the game". The number of layers depends on the level of detail of the game in its analysis and the degree of concretization of pedagogical tasks to be solved. The basic layers for working with a group communication game are the following:

- layer 1. Structure of interaction of participants within the team/group;
- layer 2. Structure of interaction between teams/groups;
- layer 3. Game decision-making by participants;
- layer 4. Control of the game process;
- layer 5. The source of uncertainty in the game;
- layer 6. Access of participants to game information;
- layer 7. Game coalitions;
- layer 8. Methods of game communication.

In each layer, in turn, we will determine, based on the same morphological box method, possible options for the development and construction of game events, and hence the relationships between the elements. When determining development options, we rely on the described experience of using games in the educational process. Note that the consideration of variants of game events is not a strict logical classification of games and is made to distinguish game events that are significant from the point of view of achieving a non-game result.

Layer 1. Structure of interaction of participants within the team

Options for the development of events in layer 1:

1. the team acts as one unit, the interaction within the team is not regulated by the rules of the game (in the extreme case, there is one player in the team);
2. one leading role is defined in the team (commander or captain). The person who implements this role has priority rights when making and announcing team decisions, organizing interaction within the team, distributing areas of responsibility between team members;
3. roles are assigned or a zone of rights and responsibilities is assigned to each team member;
4. microgroups with distributed areas of responsibility are formed in the team, interaction within the microgroup is not regulated;

5. the team has one or more special roles with its own area of responsibility;
6. there is no direct interaction in the team during the game. Each team member plays in their own playing area, contributing to the team's overall piggy bank. Players can interact at the beginning and at the end of the game.

Layer 2. Structure of interaction between teams

Options for the development of events in layer 2:

1. a game without team interaction. The achievements of a team are determined only by its actions and do not depend on the actions of other teams.
2. indirect interaction. The goal of the team is not to influence the actions of the other team, but each of them, after each action, contributes to the development of the overall game situation;
3. continuous interaction of all teams with each other. Each step of one team affects the game situation and assumes a reciprocal step of the other (other) teams;
4. the interaction of teams occurs only according to a given scheme, for example, in a circle or teams with even numbers interact only with teams with odd numbers or other options.

Layer 3. Game decision-making by participants

Options for the development of events in layer 3:

1. discrete games. Tight intervals of game decision-making are set;
2. continuous games. Decision-making takes place at every moment of time;
3. combined games. It is allowed to receive information and make decisions in the interval between the moments of making the bulk of decisions.

Layer 4. Control of the game process

Options for the development of events in layer 4:

1. the consequences of the decisions and actions of the teams are determined only by the organizer or a group of experts (judges);
2. the consequences of decisions are determined only by the game model;
3. the consequences of decisions are determined by the game model together with the game organizer;
4. the consequences are determined by the participants of the game themselves.

Layer 5. The source of uncertainty in the game

Options for the development of events in layer 5:

1. combinatorial games. The course of game events depends on the variants of combinations of game elements;

2. random games. The course of the game depends on the game randomness;
3. strategy games. The concealment of information is determined by the conscious activity of other teams pursuing their goals;
4. there is no source of uncertainty, the order of game steps and the development of game events are rigidly set by the rules.

Layer 6. Participants' access to game information

Options for the development of events in layer 6:

1. open or a game with full information – all information about goals, resources, possible actions, winnings and game reality for yourself and all other players is available to each player at the beginning of the game;
2. dynamic or incomplete information game – information to players comes gradually or is created directly by players as the game develops and can become fully known to all participants after its completion.

Layer 7. Game coalitions

Options for the development of events in layer 7:

1. competition – each team plays for itself. The teams have opposite goals. The winning of one team entails the loss of others;
2. temporary coalitions – the conditions of the game allow joint actions of teams with the redistribution of winnings. During the game, players can join temporary associations in which they act together and make decisions, as well as share the total winnings in accordance with an agreement or according to the rules of the game.
3. permanent coalitions are games in which there are fixed associations, in these associations all collegial decisions are made and the winnings are divided.
4. cooperation. There is a common goal for all participants. Winning teams is possible only when this goal is achieved.

Layer 8. The way of game communication

There are an infinite number of options for the development of events in this word. In this layer, the method of communication is defined in a descriptive way, the means of communication are defined.

Having considered all the development options in the game layers, we get a multidimensional matrix of game events from which the game can be composed (Table 2). Such a matrix is a morphological box for a communicative educational game. It allows you to move step by step from layer to layer, from parameter to parameter, making a choice in favor of a particular game event in the process

of constructing an integral game system. The options for the development of events in each layer serve as a guideline for developers, the basis for choosing a certain development of events in each layer is the educational result of the game and, possibly, other specified conditions. The methodology of designing and modifying a communicative educational game using the game structure defined in clause 1.3.1. and the matrix of game events given in this paragraph is presented in the article of the author of the study [147] and in Appendix 1, and is also designed and published in the format of a board game for developers, designers of educational games.

Thus, a communicative educational game is considered as a specially designed system that involves a person in communication and creates conditions for participants to receive a communicative experience, a person enters into such a system and begins to act in it voluntarily based on interest in the game process. This system minimally includes 14 elements: game means, game time and space, rhythm of the game, game entourage, legend, technical equipment, game and non-game result, game and non-game process, players and game equipment, interest. 5 elements from the listed: players, game equipment, non-game result and non-game process, interest, are connecting the game system with other systems. The suprasystem for a communicative educational game is the educational process. The structural connections between these 14 elements are determined by the rules of the game, which in turn can be constructed and analyzed using the method of "layering the game", called the morphological box method based on a system-morphological approach. In a communicative educational game, there are 8 basic layers: the structure of interaction between participants within a team; the structure of interaction between teams; making game decisions by participants; managing the game process; a source of uncertainty in the game; access of participants to game information; game coalitions; game communication. In each of the layers, based on the same method, variants of the development of game events are highlighted. Thus, a matrix of changes in the parameters of a communicative educational game has been compiled.

Highlighting the elements of the game and the types of relationships between them allows for a systematic analysis of approaches to designing and embedding the game in the educational process in the history of education and pedagogy, identifying the most promising (effective) for the development of communicative educational games aimed at developing the ability to cooperate, including remotely.

Table 2

Matrix of analysis of the structure of the rules of a communicative educational game

me layer (parameter)	**Options for the development of events in the layer (possible parameter values)**					
Structure of interaction of participants within the team	1.The team acts as one unit, the interaction within the team is not regulated by the rules of the game. In the extreme case, one person plays in the team.	2.Only one leading role (commander/ captain/voice) is defined in the team.	3.Roles are assigned or a zone of rights and responsibilities is assigned to each team member.	4.Microgroups with distributed areas of responsibility are formed within the team, interaction within the microgroup is not regulated.	5. One or more special roles with their own area of responsibility are allocated.	6. There is no direct interaction in the team during the game.
Structure of interaction between teams	1. Without team interaction. The game is a competition without interaction between teams. The progress of a team is determined only by its actions, it does not depend on other commands.	2.Indirect interaction. The goal of the team is not to influence the actions of the other team, but each of them, after each action, contributes to the development of the overall game situation.	3.Continuous interaction of all participating teams with each other. Each step of one team affects the game situation and assumes a reciprocal step of the other (their) teams.	4. The interaction of the teams takes place only according to the specified scheme.		

Continuation of Table 2

Game layer (parameter)	**Options for the development of events in the layer (possible parameter values)**					
Game decision-making by participants	1.discrete games - tight intervals for making game decisions.	2. continuous games - a constant opportunity to interact with the game model and make decisions.	3. combined games			
Game management and management	1.the consequences of decisions are determined by the organizer or a group of experts	2.the consequences are determined by the game model (hard control)	3.the consequences are determined by the game model together with the game organizer	4. he consequences are determined by the participants of the game		
The source of uncertainty in the game	1.combinatorial games	2.gambling or casual games	3.strategy games			
Participant's access to game information	1. open game	2.dynamic game				
Gaming Coalitions	1. competition	2. temporary coalitions	3.permanent coalitions	4.cooperation		
The way of game communication	An infinite number of options for organizing communication in the game. A specific type of communication is described by technical means, time intervals of communication, a possible hierarchy of players, the language used and other characteristics.					

1.4. Gamification as a means of developing the ability to cooperate

1.4.1 Classification of approaches to the construction of educational games

In this section, a classification of approaches to the construction of educational games is proposed based on the allocation of the main element of the game during its development. The classification is described in the corresponding article by the author [156]. The classification of approaches is the result of the analysis of scientific, pedagogical, methodological literature and sources describing the practice of using games in education, the author's own 12-year practice as a developer and presenter of meta-subject educational game programs for teenagers in Russia, Belarus and Kazakhstan. To illustrate the approaches within each of the highlighted approaches, several examples are given. A wider field of examples is considered in the articles of the author of the study [149,146,154]. The work done is necessary to highlight the gamification approach as a specific and effective approach for designing long-term communicative educational games aimed at developing the ability to cooperate, including remotely.

In the XXI century, the functionality of the educational game does not expand in comparison with the previous time [155], but it is significantly detailed. That is, there are a large number of games for solving narrow tasks, such as training in the sale of one particular product or training in working with a machine or tool, and others. At the beginning of the XXI century, a large professional group is being formed, specializing in the selection, development, integration into various processes and modifications, management and organization of games of various formats. The first training courses for game technicians, workshops and laboratories, for example, 3D GameLab [266], gaming hackathons - forums lasting from one to 7 days, uniting specialists in different fields: screenwriters, programmers, designers, etc., working on game development [269], are being organized. By the end of the 10s of the XXI century, such formats are rapidly developing from author's training courses for game technicians and developers to university programs with a bachelor's degree in the direction of "Game Design":

- Game Academy (Germany), Bachelor's degree;
- Darmstadt University of Applied Sciences (Germany), game design course;
- San Francisco Academy of Arts (USA), School of Game Design: Bachelor's and Master's degree;
- DigiPen Institute of Technology (USA), Bachelor's degree;

Ubisoft Campus (Canada), scholarship programs and courses;

- Vancouver Film School (Canada), course "Game Design";
- University of Abertay Dundee (Scotland), computer games course;
- Institute of play, a course for teachers "Teacher quest" (USA). Professional teams of game technicians develop multi-format games for any given tasks, including educational ones. With the spread

of information and communication technologies and devices, the scale of games is increasing, that is, thousands of people from different cities can be involved in one game at the same time [143; 149].

Let's consider approaches to the construction of educational games. We understand the approach as a principle combining a set of techniques and methods of studying, considering an object. The approach is the largest methodological formation, "the approach acts as a kind of platform on the basis of which both the method and the principle, combining, form a certain epistemological integrity" [35, pp.41-43]. In this case, the process of constructing an educational game is taken as the object of study. Design is the process of creating a model, machine, structure, technology with the implementation of projects and calculations [23, p. 127]. The term "game construction" is widely used by game practitioners of various fields [209, p. 121]. Thus, to describe an approach to the construction of an educational game means to determine the leading principle that unites the totality of methods and methods of developing an educational game.

In the construction of a game by analogy with the construction of a building, the elements highlighted in the previous paragraph can be distributed according to their significance for the game developer as follows (see Figure 3):

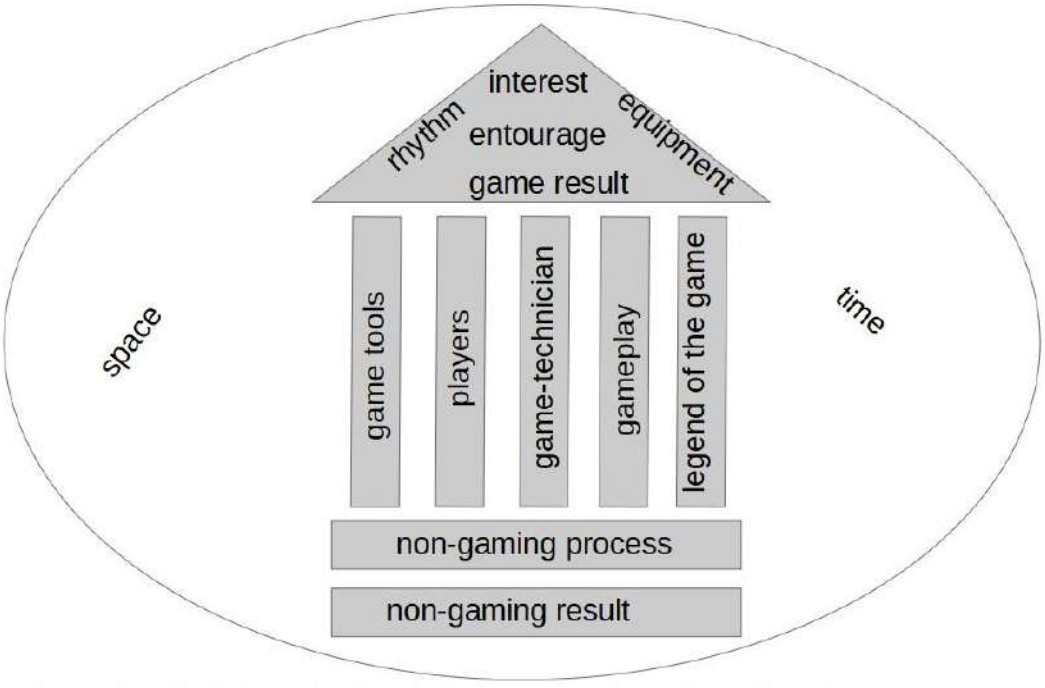


Figure 3. Basic structural elements of a communicative educational game

- limitations: **space and time;** ;

- - the foundation, the basis of an educational game: **non-game result, non-game process**;

- frame, pillars of the game: **means of the game, legend, game equipment and players, gameplay**;

- decoration: **rhythm of the game, interest, technical equipment, entourage, game result.**

The basis for the presented classification is the selection of the leading, main element in the structure of the educational game. We emphasize that we are only interested in educational games, that is, games in which the non-game result is always important for the creator of the game. But in addition to the non-game result, another priority element may be allocated when designing a game. It is on which element is defined as a priority that the following classification is based. The leading (main) element of the game is the one to which all other elements are subordinate in the design and functioning of the game as a system. The leading element can be an element from the base (non-game result, non-game process) and from the framework (game tools, legend, players and game equipment, gameplay). Elements that serve as a limitation or decoration are not found as leading elements in the design of the game. It is important that only educational games are considered, that is, games in which non-game results and players are always important to the game developer. But in addition to these two elements, one or a couple of main elements may stand out during the design process.

Thus, the following approaches are highlighted.

The subject-environment approach is an approach based on the creation of a game environment, the development of game materials and toys for independent use by children. In this approach, the basic gameplay is operating with game objects. The basic non–game process is the same. The main element is the **means of the game**. Examples of games developed within the framework of the subject-environment approach are the subject environment of M. Montessori [130], a number of game items "the gifts of F. Froebel" [229], intellectual games of B.P. Nikitin [139], developments of V. Voskobovich [180]. At the end of the XX - beginning of the XXI century, gaming applications used in education, for example, MinecraftEdu and others, appear.

Within the framework of the subject-environment approach, the participation of adults as designers of children's games is reduced to the production of **game tools**: toys and game aids, real or virtual environments, the development of tasks for these subjects. All game events for children are associated with game objects and the relationship between these objects - this is the main gameplay. The variants of the relationship between the participants of the game do not become the subject of consideration by teachers in such games. The communicative process in such games occurs spontaneously.

The simulation approach is an approach that implements the construction of an educational game as a simplified model of real life or historical reality. The basic gameplay is an imitation of a real non–game process. The basic non–game process is the same. The main elements of the game are the **gameplay**. An example is described by J.Dewey's imitation games, which occupy a dominant role in his "schools of the future" [62]. Within the framework of the simulation approach, which implements the construction of the game as a simplified model of real life or historical reality, in the XX-beginning. A large number of historical video games have appeared in the XXI century, most often telling about

military events of different years, as well as historical and economic board games, situational activity games and simulators. In the 1970s, the International Association of Simulation Games (game simulations) ISAGA was established [291]. This association unites specialists in the development of simulation games, accumulates experience, and annually holds an international conference. The actively developing directions within this approach are currently:

- medical simulators that define clinical scenarios. Example: EYESI virtual surgical simulation platform is designed to practice practical microsurgery skills;
- vehicle control simulators. Example: City Car Driving - car driving training simulator [272];
- business simulators that allow you to manage a virtual company in conditions as close as possible to the real economic and legislative situation. Example: the Russian Virtonomics project [39].

Within the framework of the simulation approach, the game is built as a simplified model of real life or historical reality. Classification of simulation games. Within the framework of this approach, the main element is the **gameplay**, which is a simplified model of the non-gaming process. The communicative process, as in the previous approach, happens spontaneously during the game, special attention is not paid to it.

An improvisational approach is an approach whose leading line is the moderating or organizing role of a game technician (for children's games, this is an adult), a game technician regulates social relations arising in the game and keeps the frame of the game in accordance with its educational goals. The basic gameplay can change and depends only on the participants of the game. The basic non–game process is creative or my-activity self-realization, its specific forms can change over the course of the game, depends on the spontaneous decisions of players and game technicians. The main element of the game **is players and game equipment**. An example of such games are free, improvisational games, which are organized and conducted by E. Bakhotsky [18] and his followers, and role-playing games, where the framework is only the described world of the game and the named role. There is always a communicative process in improvisational games, participation in improvisational games gives a good communicative experience to those who strive for it, who actively try their hand at communication. But it is also easy to "reset the communicative tension" in such games. Improvisational games do not involve scenarios and any rules in the form of instructions for action. Game technicians hold the frame of the game and control the basic rules, the gameplay depends on and is built by the players.

Fantasy approach is an approach in which the game becomes a model of a fictional world (role–playing fantasy games, virtual reality games, board games). The basic gameplay with this approach can be any, it is subordinate to the legend of the game. The basic non–gaming process is different for each individual participant of the game; possible options: relaxation, living emotions, creative self-realization, development of communicative abilities and more. The main element of the game is a **legend**. Within the framework of the approach where the game appears as a model of a fictional world, at the beginning

of the XXI century, massive role-playing quest games, board or multiplayer online games appear, which fit educational tasks. Games can be subject and meta-subject, allowing you to deal with a certain topic in the school course, to present a picture of the world from any angle or to work out, develop a particular competence. Examples:

- role-playing career guidance games [1];
- games for social adaptation [170];
- questories are plot-based live games based on active live or remote communication of people within the framework of their role-playing tasks. In education, they are used to immerse themselves in the language environment when learning a foreign language[311].

Unlike the previous approach, here the legend is not born by the players, but created in advance by the game developers, it clearly limits the possible scenarios, describes the imaginary world of the game before it begins. The communicative process accompanies such games, since most often they involve a large number of participants. But the communicative process does not have independent significance in games constructed within the framework of this approach. A fantasy game does not imply a predictable non-gaming result from the point of view of getting participants a certain communicative experience, experience of cooperation, since cooperation may not take place.

The event approach is an approach in which the game is a specially constructed event, often conflicting, the living of this event and the resolution of the conflict leads to the transfer of the relationship of the players, their skills or competencies to a new level. The basic non-game process is set by players and game technicians. The main element of the game is the **non–game result**. The game as an independent event, harmoniously inscribed in the life of the child, was researched and used in practice by S.T. Shatsky [251, p. 197]. S.A. Shmakov considered the game as an event with a certain result that can be transferred to life [254]. An example of modern games created within the framework of the event approach is the meta-objective game "The Argument of Socrates" developed by the Game Institute (USA), which is aimed at developing the ability to argue and prove one's point of view [317]. The non-game result as the leading element in the creation of the game can be set by the developer, the designer. We will be interested in games in which the non-game result correlates with the development of communication skills. This approach can be very productive for the development of short-term communicative games (from an hour to three days) aimed at developing the ability to cooperate. For longer games, this approach is unproductive due to the loss of interest of the players, the withdrawal of part of the participant from the game.

In the XXI century, a new sixth approach is being formed – **the gamification** or **gamification of educational processes**. Most often it is implemented by combining real and virtual spheres of life. This is not a necessary rule of gamification, but it is important for greater coverage of participants and ease of use of developments by teachers from different countries. Gamification involves building a game

around a basic meaningful non-gaming process**. The basic non-game process** itself does not change, the game is constructed "on top" of this process and is an add-on to any already functioning system. The content process for which and around which the game is being built is planned to be implemented regardless of the availability of a constructed game, for example, within the framework of an educational course. In this case, the game is launched to engage and retain the activity of participants in this process. It is important that with such a construction of the game, the participant can participate in the content process, but not participate in the game if there is no desire or for other reasons, but cannot participate in the game without participating in the basic non-game process. That is, game elements with this approach are easily separated from the meaningful educational process. The main element is the basic non–game process. It is important that the communicative process can be a basic non-gaming process, which means it can be the focus of attention of the designer and the game technician when designing the game within the framework of the gamification approach. The following paragraph is devoted to the gamification approach.

Thus, **6 approaches** to the design of the game are identified: **subject-environment, imitation, fantasy, improvisational, event, and gamification**. Each of these approaches assumes the choice of a leading element in the structure when developing a game. The choice of approach determines the range of educational tasks that a teacher can solve with the help of a game designed within the framework of the approach. This classification helps to determine the approaches in which the construction of communicative games is most effective. This is an event-based and gamification approach. In the event-based approach, when designing, the communicative experience can be set as a non-game result, since the non-game result is a priority element. In the gamification approach, the non-gaming process, which is the main element in the design, can be the process of cooperation. The other 4 highlighted approaches are not a sufficient condition for a game developed within their framework to ensure the development of communicative skills, since the communicative process in games constructed using subject-environment, fantasy, improvisational and imitation approaches develop randomly.

1.4.2. The specifics of the gamification approach in the creation of educational games

This section discusses the concepts of "gamification approach", "gamification" and clarifies the application of these concepts in a pedagogical context, which is described in the relevant articles of the author of the research [148; 154]. The term "gamification" is widely used by practitioners of various professional fields, including in education. It is especially widely used by European, American and Japanese colleagues, and since 2010 it has started its movement in Russia. The term gamification, or gamification, became widespread in the second half of 2010, when the results of a new marketing move used by various companies combining gaming and sociomedia technologies were analyzed in the United

States. The inspiration for the idea of promoting game elements in all spheres of life was the psychologist G. Zicherman. In 2011, the first "Gamification Summit" (Gamification Summit) was held in New York under his leadership - a major international forum dedicated to gamification, which has now become traditional (GSummit). In Russian-language sources, the gamification process began to be widely discussed after the training course of Professor K. Verbach of the University of Pennsylvania “Gamification”, organized in August-October 2012 with the help of the online education network platform Coursera [277]. At the beginning of this educational course, Professor K. Verbach, following G. Zicherman, defines gamification as the process of using game mechanics and game thinking to solve non-game problems and to involve people in any process. During the further course, a more detailed description of this process takes place, from which several conclusions can be drawn. An important aspect of gamification is to achieve goals with its help that are not directly related to the content of the game, for example, working out certain skills, engaging in routine tasks, increasing labor productivity, and more. Gamification is especially useful in areas where it is difficult to cope alone through willpower alone: dieting, playing sports, quitting smoking, supporting corporate culture, training, and others. Gamification is not just a process of attracting individual elements, it is a process of combining game elements around and for some purposeful process subordinate to this non–game process. The result and purpose of developing and combining game elements around a process is to increase motivation or interest, as well as to change the systemic behavior of a person, a group of people, a certain part or society as a whole.One of the examples of the gamification of pedagogical education is described by the author of the study in the article [151]. An important role in the development of gamification was played by the growth of social networks and the spread of technical means associated with the rapid exchange of information: smartphones, tablets, netbooks, etc.

Since 2011, there have been discussions in scientific circles about the relationship between the concepts of game and gamification. A review of such discussions is devoted to one of the articles of the author of the study [148]. At the moment, there are several approaches to the identification and definition of the concept of "gamification". The first approach is proposed by a group of scientists: S.Deterding (Institute of Media Studies, University of Hamburg, Germany), D.Dixon (Center for Digital Culture Research, University of the West of England, UK), R.Khalled (Center for Computer Games Research, Copenhagen University of Information Technology, Denmark), L.Nackle (Faculty of Information and Business Technologies, University of the Ontario Institute of Technology, Canada). Taking as a basis a brief definition: "gamification means the use of game design elements in a non-gaming context", scientists "unpack" it and set the boundaries of the use of the term "gamification". In May 2011, the first scientific article devoted to the definition of the concept of "gamification" was published - Deterding S., Kahled R., Nacke L., and Dixon D. "Gamification: Towards a Definition" [278], in which four authors take the first steps towards introducing the concept of "gamification" into scientific circulation.

In September 2011 The same group of scientists publishes a second detailed article "From Game Design Elements to Gamefullness: Defining "Gamification"", which presents reflections on the position of "gamification" in the field of similar concepts [279]. The first step in such studies is to establish similarities and differences with already used similar concepts. For gamification, these are: game design, game, applied game, game interaction, fun. Scientists distinguish concepts, including through schemes, and also focus on the terms included in the definition, showing that each of them sets a certain boundary for the concept. The distinction occurs through the construction of antinomies: the game is fun, the whole is parts. Based on them, the conceptual field is divided into quadrants (see Figure 4).

Researchers separate full–fledged games and applied games from gamification through the "whole – parts" axis, determining that gamification is the use of game elements. Game design and toys are

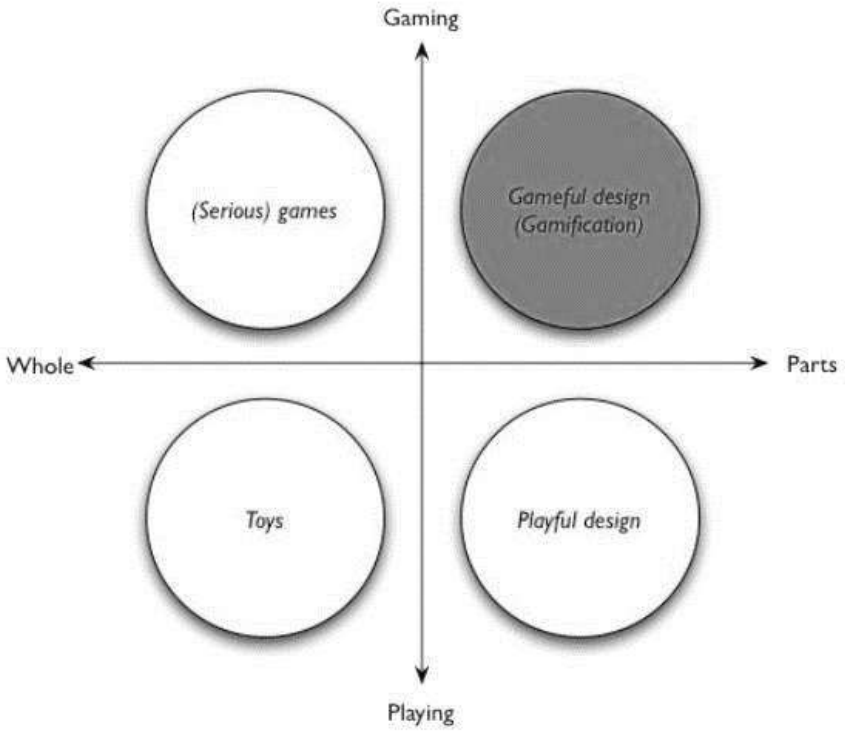


Figure 4. Conceptual field. Authors are S. Deterding, D. Dixon, R. Khaled, L. Nak

separated from gamification by scientists using the "game – fun" axis, establishing that gamification is primarily related to the game as a space with a set of certain rules, game tasks and goals, as well as the ability to win or achieve a certain level of gaming skill. The basis of their reasoning lies in the distinction between the concepts of Ludus and Paidia, made in earlier works. So R. Caillois in the work "Man, Play and Games" ("Man, Fun and Game") considers Ludus (game) and Paidia (play, fun) as activities of various kinds. Paidia refers to free improvisational expressive activity, Ludus is characterized as a process of playing in accordance with certain goals and according to set rules [87, p.7].

Highlighting the trajectories of the use of video games and exploring human-computer interaction in socio-cultural practice (see Figure 5), the authors note that the use of games in a non-gaming context

can be divided into two large groups: the use of full-fledged games and the use of only game elements. In turn, in the "game elements" branch, they distinguish: game technologies, game practice and game design, arguing that it is game design that most closely correlates with gamification.

The main conclusion in the first approach is the following statement - definition:

"Gamification is:

the use (not distribution to real life)

of elements (not full-fledged games)

of a design or device (nor technologies based on the game, and no other practices related to the game)

characteristic of the game (not for entertainment, playing or fun)

in a non-gaming context (regardless of the specific intentions of use or media implementation)" [279].

Another attempt to define the concept of gamification in the scientific literature was made by Finnish marketing researchers K. Huturi and Y.Hamari (Helsinki Institute of Information Technology). They define gamification as a form of bundling services, where the main service is enhanced by an additional, rule-based service system that provides feedback and a mechanism for user interaction in order to promote and support the overall user value [290]. This definition is broader than the previous one. It focuses on service systems based on rules and providing user interaction, and such systems can be not only gaming. In the field of education, the definition of K.Khuturi and Y.Hamari can be successfully used when it comes to a certain educational service, for which an additional shell has been created to attract and retain students. For example, one of the major resources in Runet for learning English LinguaLeo uses a number of such elements. For engagement: intuitive interface, easy start, drawing up an individual study program depending on the interests, goals and scope of use of a foreign language, cross-platform, that is, the ability to launch the service on any device; for retention: a scale of progress of each student, interactive exercises for practicing grammar and vocabulary, a large selection of audio and video material various topics. Thus, feedback and interaction with the user is provided to keep him in the system, but it is difficult to call it gamification, since there is no common integral game that unites the user's efforts to achieve non-gaming goals.

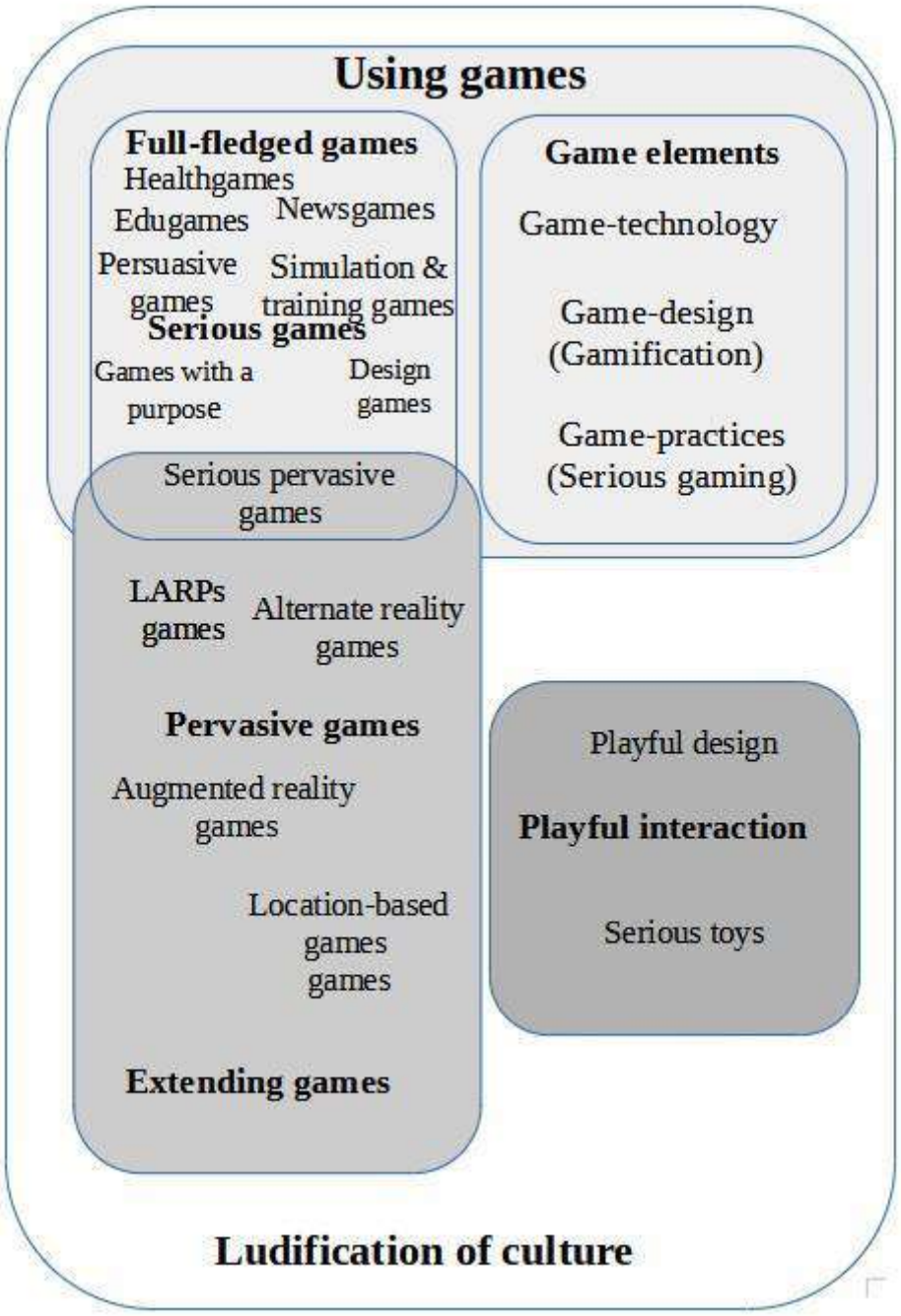


Figure 5. The location of the concept of "gamification" in a large field of similar concepts. Authors are S. Deterding, D. Dixon, R. Khaled, L. Nak

In the third approach, in order to distinguish gamification as a phenomenon, it is proposed to establish the presence or absence of certain parameters in comparison with other gaming phenomena. The researcher A. Marczewski offers a table (see Table 3), which focuses on the presence of all the characteristics that are important, from the author's point of view, for the game: game thinking, game elements, gameplay and fun / fanaticism. It follows from the contents of the table that the difference

between gamification and the game is that gamification does not have the characteristic "just for fun", that is, it implies that the gamification process has a serious non-gaming purpose, as well as the absence of gameplay [301].

Gameplay is a term widely used in gaming communities. The gameplay includes a different set of specific methods of interaction between the game and the player, a set of rules and mechanics [84]. The word gameplay can be translated into Russian as "playability", attractiveness for the player, although professionals most often do not translate it, but use a simple transliteration: "gameplay". A. Marczewski also suggests axes that delimit the space of game concepts (see Figure 6). The vertical axis sets the stretch "goal – pleasure", and the horizontal "lack of gameplay - the presence of gameplay". Gamification falls into the quadrant with the presence of an out-of-game goal and the absence of gameplay. Games are in the quadrant with the presence of gameplay and the presence of "fan" or funny, that is, entertaining content. Applied games, such as gamification, are created to solve non-game tasks, so they are in the quadrant with a specific purpose and they have a gameplay. In this scheme A. Marczewski shares the concepts of "gamification" and "game design", which are in the same quadrant for the authors of the first approach, through the presence of gameplay [301].

Table 3

Differences in game terms. The author is A. Marczewski

	Game thinking	**Game elements**	**Gameplay**	**Just for fun**
Game design	+			
Gamification	+	+		
Applied game/Simulator	+	+	+	
Game	+	+	+	+

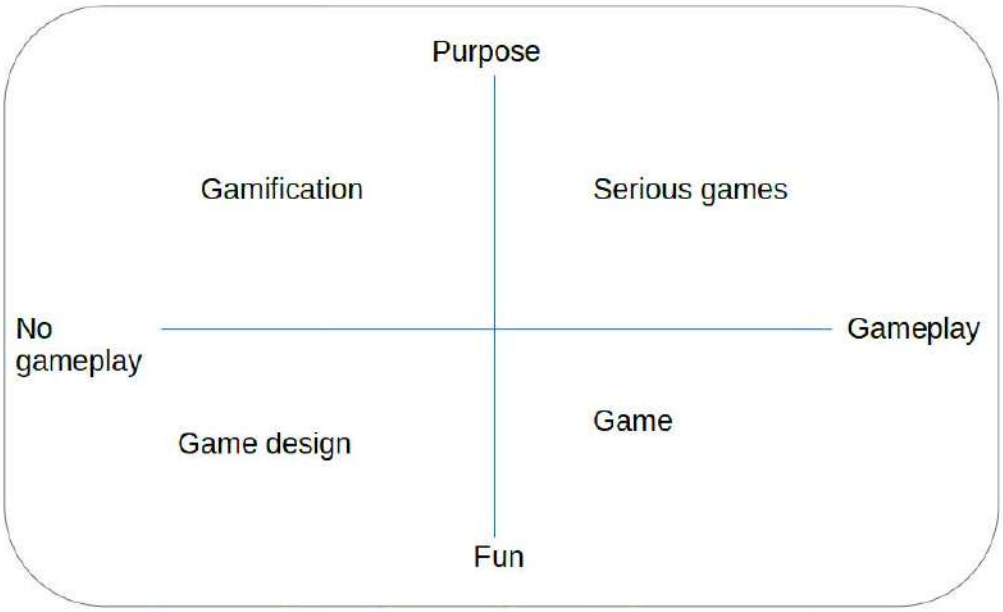


Figure 6. Differentiation of the field of game concepts. The author is A.Marczewski

The term gamification is used only in pedagogical science [148]. Based on the criteria given in the definitions considered, it can be concluded that gamification itself is a means of organizing any activity. In the case of gamification, the gameplay and all other processes related to education go in parallel and simultaneously, and gamification in no way affects the content of education, but motivates participants to the relevant activities.

We consider **gamification as the process** of creating a game within the gamification approach, and **gamification as the result** of applying a gamification approach, that is a game, built within such an approach. The gamification approach is an approach to building an educational game in which the main, core element that subordinates all the others is the **non-game process**, on which all other elements of the game are "strung" during development, all other elements of the game are subordinated to it: legend, entourage, rhythm of the game, equipment, the result of the game and gameplay, and everything else. In the title of the dissertation, the term "gamification" is used in the sense of the result of the gamification approach to the construction of the game.

In the gamification approach applied in the field of education, three branches can be distinguished [158]. The basis is the scale and features of the non-game process, taken as the basis of the game. The allocation of branches is necessary in order to narrow the search for gamification approach tools for building games.

A. gamification of the educational module, in which the created game is initially tied to the content of the course;

Example: Codeacademy [276]. The service helps all those who want to start their own technology companies without having the necessary technical skills to master programming. New users, working

on sets of lessons from other users, learn to write simple functions and create more complex tasks and solutions. Actively uses badges, performance scales and other game elements to engage and motivate students to be active.

B. gamification of the training course with the possibility of replacing the subject content.

Here is an example of the gamification of an educational course developed by a physics teacher from one of the US schools [273]. The Classcraft resource under the motto "Make learning an adventure!" encourages teachers to connect themselves and connect students to a motivating game that will become a shell for any course during the whole semester or academic year, to clothe the educational activities of students of a particular class in a role-playing game. Before starting the Classcraft game, each student must choose a character from the three classes presented: Healer, Mage or Warrior. Each of the classes has its own unique properties and abilities designed for different types of students. Classcraft is played in teams of five or six students throughout the school year. This approach encourages less sociable students to interact with other students to win. The whole team benefits from joint actions, and all participants learn to take into account the needs of other players before acting themselves. Classcraft is understandable to students because the risks and rewards in the game have an impact in the real world. Classcraft is integrated into the learning process.

• the issuance of assignments, tests, and training materials is organized using interactive forums presented on the resource;

• the teacher awards experience points to the heroes of the game (and therefore to the students) directly on the forums when they answer questions and help each other;

Performance analytics, also provided by this resource, allows parents to receive complete information about their child's progress.

In addition to simple accumulation and an expanded range of abilities of the game's heroes, there are a number of game events that directly affect the development of events in the lesson, for example, an unexpected test work or a survey (in the game it can be a natural disaster). There are many non–traditional abilities that the hero of the game earns - one of them is the opportunity to have a lesson or go out at any time for 5 minutes. The teacher himself can add or remove the incentives he likes for the players. Thus, Classcraft and the educational process go in parallel, the gamified shell serves as a means of organizing the educational process. It should be noted that at the moment there is also a Russian-language version of the described resource, which is used experimentally in their pedagogical practice by several Russian teachers.

Examples of other similar game modifications, including for higher education: 3D GameLab and ClassXP [266; 275].

C. gamification of educational processes, meta-subject educational programs (not subject gamification).

The gamification approach is also used to design games designed for educational and socializing processes. The process of creating an intelligent product by large flexible communities can be effective only if the interacting people have the ability to cooperate and work in a team. It is possible to state the shortage of such competencies and the need for its mastery by the increasing wave of special team training among new employees of large corporations. With the development of mass cooperation, vividly described by D. Tapscott in "Wikinomics" [214], and the restructuring of the production system, the task of teaching teamwork descends to an earlier stage of education – school. This already difficult task is also complicated by the peculiarities of adolescence, which prevent children from interacting constructively with their peers, not paying attention to personal likes and dislikes. Games created within the framework of the gamification approach help the teacher to involve the teenager in the process of self-education and self-organization and support his motivation not only with "higher" and distant prospects, but also with specific small game tasks and constant feedback. Feedback is also presented in the form of simple game mechanics, often used both in mobile applications and in online games: progress scale, scores, badges, achievement levels, rating tables; and in the form of more complex mechanics found in social networks and multiplayer games: mutual encouragement, unexpected game meetings, manifested interrelationships of events and others. The connection of real actions and virtual events allows you to use all the spheres of activity relevant to modern man to concentrate his efforts in achieving the goal.

Here are concrete examples of already existing gamified programs. The Classdojo resource, which works in 6 languages, involves the creation of a game account for each child in the classroom and the teacher's allocation of incentive criteria, for example: punctuality, helping a classmate, completing tasks and others. In his account, the child plays for one of the fictional characters. Each encouragement of the teacher opens up new opportunities for the game hero: from the choice of hair coloring to extraordinary abilities. The characters inside the game visit each other, various game events occur that are no longer related to the child's learning process, where they use their opportunities [274].

An example of the gamification of the entire educational process is the project of the "Institute of the Game" (USA) school "Quest to Learn", launched in 2010 [310]. Every child at school, like the teacher, connects to the internal gaming social network. Through this network, children receive quest subject tasks, join teams or perform them individually, gain experience points, grow in game levels. Exams are like intellectual battles between robots. Robots have exactly the knowledge that each particular child filled them with in the process of preparing for battle (in the learning process). Failure in the exam is just an unsuccessful attempt that requires reflection, training and preparation for the next battle. In addition to such a gamification plan, educational games, live action games, board games, role-playing games, video format games are actively used in the school [ibid.].

Of the three branches of the gamification approach identified for our research, we need the third: gamification of educational programs and educational processes. This is the most extensive non-gaming process in terms of duration. The development of the ability to cooperate effectively develop over a long period, not associated with a time limit, as in a fixed time, and not limited by the specifics of any school subject.

For us, the communicative process is of particular interest as a non–gaming process when designing a game within the framework of the gamification approach. The use of gamification as a means of developing the ability to cooperate can become a key tool for teachers both in the conditions of distance education [152] and in the conditions of traditional full-time education. In modern society, the communicative process can be carried out remotely, which means it can be asynchronous in time, limited to special communication channels, use only written speech, or only video appeals, audio appeals, or use only a visual channel, accompanied by synchronous access to some online information processing program, etc. It is important that during gamification, the main element is the non-gaming process, its significance is high not only within the game. The duration of a non-gaming process, in our case a communicative one, is limited only by the duration of the intended communication, which can be interrupted and resumed again. In the gamification approach, when building a game, all these natural moments are taken into account, which are woven into the legend of the game. The interaction experience that players receive during the game can be comprehended during the game and immediately applied during the same game.

In our opinion, the gamification approach is most productive when creating educational games that involve the development of the ability to cooperate as a non-gaming result, taking into account the specifics of the skill for modern society [150]. Examples of gamified educational programs aimed at developing the ability to cooperate with methodological support are described in the second chapter and in the appendices.

Among the six approaches described in clause 1.4.1, the most suitable for constructing communicative educational games are event-based and gamification, since it is the communicative experience that is needed for the development of communicative skills. Only in these two approaches it is possible to initially set a communicative process or a specific communicative experience as the main element of the game. In the case of all other approaches during the game, the communicative process may happen spontaneously or not at all. The gamification approach allows you to replicate the game to a large number of participants, use it for a long time without losing the interest of players (a year or more) and distribute the game to all human life processes. The potential of the gamification approach can be used in the design of educational games aimed at developing the ability to cooperate. This approach is closest to the realities of modern society, the ways of communication in a developing

network society. Games created within the framework of this approach, called gamification, can be an effective means of developing the ability to cooperate for middle school students.

Conclusions on Chapter 1

Modern society is increasingly acquiring a network organization characterized by a multiplicity of dynamic connections, mass cooperation. The basis for the support of such a system is the Internet. For self-realization in such a society, a person needs to develop communicative abilities, in particular, the ability to cooperate. Communication as a form of interaction of people in the process of their life is important for human social development. Communication is an integral quality of a person, and in a networked society, it is also a way of his existence, self-realization and development of creativity. Development of information technologies, penetration of the Internet into all spheres of life: everyday life, leisure, education, science, personal relationships - lead to an increase in the intensity of communication links and relationships, which makes the ability to cooperate one of the key skills of a person. The ability to cooperate is a communicative skill necessary in building constructive interaction of several subjects in achieving a common goal, solidarity in understanding the chosen goal. Three interrelated components of the ability to cooperate have been identified: cognitive-reflective, motivational-value, communicative-activity.

The specifics of the ability to cooperate in modern society is:

- *scalability* is a characteristic of the skill that allows its owner to work productively in small (3-5 people) and large (more than 30 people) groups;
- *flexibility* is a characteristic of a skill that allows its owner to work productively in groups of different ages, worldviews, cultures, and languages;
- *technical mobility* is a characteristic of a skill that allows its owner to freely use technical means of communication and constantly master new ones;
- *remoteness* is a characteristic of a skill that allows its owner to increase the share of remote communication with people living in different time zones.

Cooperation is a multidimensional concept studied by teachers. The ability to cooperate in research is understood as a special communicative skill necessary to build a constructive interaction of several subjects in achieving a common goal, solidarity in understanding the chosen goal as a common one. Based on the phases of cooperation, 4 levels of development of this skill are identified and characterized: zero, low, medium and high.

The peculiarities of adolescence, in which communication is the leading activity, allow you to work especially productively on developing the ability to cooperate during this period. When considering the means of developing the ability to cooperate, special attention should be paid to the leisure time of a teenager as the most time-consuming and less structured resource compared to the allotted time, which is necessary for working with the development of communicative abilities and skills,

as well as extracurricular activities in the middle school, which is the most flexible in the form of organization. Games can serve as a means of developing the ability to cooperate. An important aspect for the development of communicative games is the specifics of remote communication.

Approaches to the design of communicative educational games, the choice of the most effective ones for the development of the ability to cooperate are discussed in the fourth paragraph. The classification of approaches is based on the allocation of the main elements in the construction of the game, which are described in the third paragraph.

The communicative educational game is considered as a specially designed system that involves a person in communication, creating conditions for participants to gain communicative experience. This system includes 14 elements: game means, game time and space, rhythm of the game, game entourage, legend, technical equipment, game and non-game result, game and non-game process, players and game equipment, interest. 5 elements from the listed: players, game equipment, non-game result and non-game process, interest, are connecting the game system with other systems. The "oversystem" for a communicative educational game is the educational process. The structural connections between these 14 elements are determined by the rules of the game, which in turn can be constructed and analyzed using the method of "layering the game" based on a system-morphological approach. In a communicative educational game, there are 8 basic layers: the structure of interaction between participants within a team; the structure of interaction between teams; making game decisions by participants; managing the game process; a source of uncertainty in the game; access of participants to game information; game coalitions; game communication. In each of the layers, variants of the development of game events are highlighted. Thus, a matrix of changes in the parameters of a communicative educational game has been compiled.

Highlighting the elements of the game and the types of relationships between them allows for a systematic analysis of approaches to designing and embedding the game in the educational process in the history of education and pedagogy, identifying the most promising (effective) for the development of communicative educational games aimed at developing the ability to cooperate, including remotely.

The analysis of educational gamepractice from antiquity to the present day has allowed us to identify six approaches to the construction of an educational game. The following approaches are highlighted:

- **The subject-environment approach** is an approach based on the creation of a game environment, the development of game materials and toys for independent use by children. The main element is the means of the game.
- **The simulation approach** is an approach that implements the construction of an educational game as a simplified model of real life or historical reality. The main elements of the game are the gameplay.

- **An improvisational approach** is an approach whose leading line is the moderating or organizing role of a game technician (for children's games, this is an adult). The main element of the game is players and game equipment.
- **Fantasy approach** – an approach in which the game becomes a model of a fictional world (role-playing fantasy games, virtual reality games, board games). The main element of the game is a legend. Communication in games created within the framework of a fantasy approach is most often present, with respect to the process of cooperation it develops randomly.
- **The event approach** is an approach in which the game is a specially constructed event, often conflicting, the living of this event and the resolution of the conflict leads to the transfer of the relationship of the players, the perception of the players, their skills or competencies to a new level. The main element of the game is the non–game result.
- **The gamification approach** is an approach in which the game is designed as an add-on to the basic non-game process. The main element of the game is a non–game process.

Among these six approaches, the most suitable for constructing communicative educational games are event-based and gamification, since it is the communicative experience that is needed for the development of communicative skills. Only in these two approaches it is possible to initially set a communicative process or a specific communicative experience as the main element of the game. The gamification approach allows you to replicate the game to a large number of participants, use it for a long time without losing the interest of players (a year or more) and distribute the game to all human life processes. The potential of the gamification approach can be used in the design of educational games aimed at developing the ability to cooperate, including remotely. This approach is closest to the realities of modern society, the ways of communication in a developing network society and the interests and characteristics of adolescents.

The term "gamification" is used in two senses in a pedagogical context: gamification is the process of creating a game within the gamification approach, and gamification is the result of using a gamification approach, that is, a game designed within the gamification approach.

Chapter 2. Development and implementation of an experimental educational program based on gamification aimed at developing the ability to cooperate

The experimental search and experimental work consisted of three stages.

The first stage: the development and adjustment of game educational programs within the framework of the gamification approach, which can be used in extracurricular activities in middle school; the search for the most optimal forms, the ratio of game event and gamified parts of such programs (from 2006 to 2012).

The second stage: data collection for the study, ascertaining and formative parts of the pedagogical experiment (from 2007 to 2015).

The third stage: processing and interpretation of the collected data (2018-2023).

The experimental base consisted of:

1. State budget educational institution middle school No. 534 with in-depth study of the English language named after the Hero of Russia Timur Sirazetdinov of the Vyborg district of St. Petersburg (4th grade);
2. State budgetary educational institution middle school No. 217 Krasnoselsky district of St. Petersburg named after N.A.Alekseev (3rd grade);
3. State budgetary educational institution middle school No. 438 of the Primorsky district of St. Petersburg (6 classes);
4. State budgetary educational institution middle school No. 527 of the Nevsky district of St. Petersburg (2nd grade);
5. State budgetary educational institution middle school No. 549 Krasnoselsky district of St. Petersburg (3rd grade);
6. State budgetary educational institution Gymnasium No. 505 of the Krasnoselsky district of St. Petersburg (4th grade);
7. State budgetary educational institution of middle school No. 466 of the Kurortny district of St. Petersburg (2nd grade);
8. State budgetary educational institution Gymnasium No. 433 of the Kurortny district of St. Petersburg (1st grade);
9. State budgetary educational institution middle school No. 683 of the Primorsky district of St. Petersburg (2nd grade);
10. State budgetary educational institution of middle school No. 380 Krasnoselsky district of St. Petersburg (3rd grade);
11. State budgetary educational institution middle school No. 91 of the Petrogradsky district of St. Petersburg (2nd grade);

12. State budgetary educational institution middle general education school No. 113 with in-depth study of subjects of the information technology profile of the Primorsky district of St. Petersburg (2nd grade);
13. State budgetary educational institution Lyceum No. 369 of the Krasnoselsky district of St. Petersburg (1st grade);
14. State educational institution middle school No. 521 with in-depth study of mathematics and computer science of the Krasnogvardeysky district of St. Petersburg (1st grade);
15. State budgetary educational institution of middle school No. 335 of the Pushkin district of St. Petersburg (1st grade);
16. State budgetary educational institution of middle school No. 371 of the Moskovsky district of St. Petersburg (2nd grade);
17. State budgetary educational institution of middle school No. 394 of the Krasnoselsky district of St. Petersburg (2nd grade);
18. State budgetary institution middle middle school No. 119 of the Kalininsky district of St. Petersburg (2nd grade);
19. Municipal budgetary educational institution "Gymnasium No. 1", Korolev, Moscow region (4th grade);
20. GUO middle school No. 12, Novopolotsk, Vitebsk region, Republic of Belarus (2 classes);
21. GOU Middle school No. 3, Kondopoga, Republic of Karelia (2nd class);
22. Municipal budgetary educational institution Siverskaya gymnasium GP Siversky, Gatchinsky district of the Leningrad region (1st grade);
23. Municipal educational institution "Middle school "Toksovsky Center of Education" named after Hero of the Soviet Union V.Ya. Petrov, Vsevolozhsky district, Leningrad region (5 classes);
24. GU School-Lyceum No. 1, Astana, Kazakhstan (3 classes);
25. GU Lyceum School No. 54, Astana, Kazakhstan (3rd grade);
26. GU "Complex "Kindergarten – gymnasium school No. 46", Astana, Kazakhstan (3rd grade);
27. GU Gymnasium No. 2 named after Gafu Kairbekov, Astana, Kazakhstan (1st grade);
28 . GU Middle School No. 28, Astana, Kazakhstan (3rd grade);
29. Three international children's and youth gatherings "Empire of Friendship" (24 in total), organized by the International Foundation for the Support of Children's and Youth Squad Movements "Winged Unicorn" (the author of the study acted as the head of the rally programs, co-developer and head of the game department that develops and implements the rally programs);
30. Two online meetings and three online tournaments "Unbelievable, but a fact!" organized by the same Foundation (the author of the study was the head, co-developer and co-host of the meetings and tournaments programs).

2.1. Development of an educational program based on gamification aimed at developing the ability to cooperate

For experimental work on the development of the ability to cooperate among adolescents in extracurricular activities, three game educational programs were developed and repeatedly implemented. In their development, two approaches were used, which in the theoretical chapter were identified as the most suitable for creating communicative educational games: gamification and event-based. The gamification approach was the main one, the event approach was used to develop individual short-term (1-3 hours) events, of which there were no more than 7 in each annual program. Only the consistent implementation of these programs is assumed, therefore, in the development process, the continuity of game forms and the gradual complication of game, creative and cognitive tasks that participants solve during participation in each of the programs were laid. The experimental search work consisted in annual questioning of participating children, conducting structured conversations with teachers, collecting feedback from parents and teachers, finalizing programs in accordance with the collected information, as well as finding a balance of the game event and gamified parts of the program, finding the most optimal and effective forms of program implementation in schools, developing a methodology for program implementation. Let 's list the developed programs:

1. "My bright World" - the program is designed for 5th or 6th grade students, the duration of the program is 1 academic year. The basic process of the program "My Bright World" as a game is cooperation in solving game problems and in joint classroom activities. The entire program is implemented with face-to-face contact between the program host (a game technician teacher and/or a class teacher) and its participants. The program can be conducted by the class teacher independently after training.

2. "Magic Country" - the program is designed for the 6th or 7th grade, the duration of the program is 1 academic year. The basic process is cooperation in learning, play, cognitive process and creative activities. Part of the program is implemented through remote communication, part – face-to-face, with direct contact between the program host and participants. To conduct the program, 1 or 2 game technician teachers with special training are needed.

3. "Fantastic reality", the program is designed for grades 7-8 or 8-9, the duration of the program is 2 academic years. The basic process is cooperation in solving game, cognitive tasks and in implementing joint educational projects of various scales. This program is the final one, assumes partial implementation through face-to-face meetings with the program hosts (one- and two-day game seminars), most of the program is implemented through remote communication through a social network

and a specially designed program. To implement the program, a group of game technicians with special training is needed.

In each of these three programs, a whole class of a middle school (this is the main form) or a consolidated group of peers of permanent composition studying in the same educational organization and having the opportunity to communicate during leisure time can participate.

Additional developed and implemented game programs, which in this study are presented as one of the types of diagnostics of the ability to cooperate, were conceived and implemented in continuation of the idea of developing the ability to cooperate both in person and remotely:

1. "Empire of Friendship" - international children's and youth gatherings that unite both participants of annual programs and other interested participants and teachers. Duration from 7 days (when organizing a rally in autumn, winter, spring holidays) to 21 days (during summer holidays). International children's and youth gatherings were organized on the territory of three countries: Russia, Belarus and Kazakhstan. The number of participants in each rally varied from 50 to 150 people. The list of 24 meetings held, indicating the venue and dates, is presented in Appendix 2;

2. "Unbelievable, but a fact!" - international children's and youth online meetings (three-day remote games), implemented through the Vkontakte social network and remote communication tools, and online tournaments (one-day remote games). A list of five organized tournaments and gatherings with dates and number of participants is provided in Appendix 3.

The development of the program "My Bright World" began in the spring of 2006 by a group of teachers, which was united by the St. Petersburg Public Foundation for the Support of Pioneer and Scout troop movements "Winged Unicorn". Later, having opened a branch in the Republic of Kazakhstan, and actually conducting educational programs for participants of Russia, Belarus and Kazakhstan, the Foundation acquired international status and was renamed the International Fund for the Support of Detachment Movements "Winged Unicorn". The development of annual game programs was conducted in response to the need of classroom teachers for an extracurricular program, which:

1. contributed to the development of the ability to cooperate within the classroom,

2. helped the class teacher in the development of the class as a self-organizing group,

3. contributed to the activation and involvement of children in school extracurricular events,

4. contributed to the formation of a positive atmosphere of cooperation in the classroom based on an interest in self-development.

Classes that entered the program at the request of the class teacher and the school principal received the status of a squad and were included in the squad life – a set of educational events organized by the Foundation. This need was identified during conversations with classroom teachers of grades 5-8, interviews with colleagues and personal observation of teachers included in the first experimental group, classes during their work as subject teachers of the middle school. The teaching experience of the

teachers of the first experimental group ranged from 3 to 20 years, in the future, the work experience of classroom teachers ranged from 1 year to 25 years. The need for a program to develop the ability to cooperate is also confirmed by the constant growth in demand for the implementation of the "My Bright World" program in different cities in the absence of its advertising. Since September 2006, the program "My Bright World", as it was developed, began to be implemented by the Foundation's employees (the head of squad movements and the teacher-game technician) and classroom teachers who joined the experimental group. The author of the study at that moment was a class teacher of the 6th "B" class in GBOU Middle School No. 217 and joined the group of co-developers and presenters of the "My Bright World" program in her class, starting in 2007 she became a co-developer and presenter of annual gaming educational programs that are a continuation of the "My Bright World" program: "Magic Country" (annual program), "Fantastic reality" (two-year program). For children, each of these programs was a game, each completed game became a step, a level in the participant's gaming status. From the 2006/2007 academic year to the 2016/2017 academic year, the My Bright World program was held in 28 schools in Russia, Belarus and Kazakhstan. The total number of classes that took part in the program is 70. Of these, 5 classes started participating, but at different stages (stage 2-4) stopped participating without completing the program. These 5 classes took part in a remote limited form of implementation (more details of the implementation forms are presented below). The number of children in each class ranged from 22 to 34 people. The total number of children who took part in the program (from beginning to end) is 1400 people. Forms of implementation of the "My Bright World" program:

- full-time (from 2005/2006 academic year to 2014/2015 academic year). The program in full form for children is conducted by a trained game technician teacher, the head of squad movements and a class teacher who has previously been trained at a series of face-to-face training seminars;

- full-time remote (2013/2014 and 2014/2015 academic year). The program is implemented by a class teacher who receives methodological and informational support during the course from a game technician teacher in the form of webinars, consultations, detailed methodological descriptions;

- full-time limited (since 2007/2008).year to 2015/2016 academic year). The program is implemented by a game technician teacher, the involvement of the class teacher consists only in organizing the place and time of meetings of children with a game technician teacher according to a pre-agreed schedule. In this case, there is no gamified support, only staged game events are conducted;

- remote limited (2013/2014 academic year). The program is implemented by a class teacher who receives methodological and informational support during the course from a game technician teacher. The limitation is that only part of the program is taken for implementation, namely stage game events, the gamified part of the program is minimized.

It should be noted that the practical development and implementation of the game program "My Bright World" has been conducted continuously since the 2005/2006 academic year. The search for

forms and content for the program was based on the pedagogical and gaming experience of the developers. There were teachers in the group, class teachers with experience from 1 to 25 years, some of the teachers before that had extensive practice with temporary children's groups, were part of the active student teaching team. Annually, according to the results of a survey of program participants (children, teachers and parents), according to the results of pedagogical observations of classroom teachers and game technicians, as well as during the theoretical research of the author, the program was adjusted: stage game events were developed and replaced, the legend was clarified, with the spread of individual technical means used by children and parents, the technical program support, the balance between the gaming and gaming event part of the program was clarified. The final version of the program was adopted at the end of 2012. This year, the author of the study completed distance learning on the course of Professor K. Verbach of the University of Pennsylvania "Gamification" (gamification). Appendix 4 shows a variant of the implementation of the "My Bright World" program for the 2013/2014 academic year, after which minor changes were already made to the program. The following describes the procedure for developing a program with a division into a gamification (developed within the framework of the gamification approach) and a game event (developed within the framework of the event approach). The gamification part is the general framework, game events are included parts, independent blocks of the game. The division into the gamification and event part is important not only to describe the theoretical part of the development, but also to present some of the research results. During the implementation of the program in some classes, the gamification part was minimized and only the game event part was left, which significantly reduced the effectiveness of the program as a means of developing the ability to cooperate.

Thus, the development of three game programs, each of which lasts one or two years, took place over 7 years. During these 7 years, the program was adjusted after each year of implementation in accordance with the information collected during the survey of children, conversations with classroom teachers, parents' feedback, theoretical research of the author and the gradual expansion of theoretical and practical works devoted to the issues of gamification in various spheres of life. When developing educational programs, two approaches were used, which in the theoretical chapter were identified as the most suitable for creating communicative educational games: gamification and event-based. The gamification approach was the main one, the event approach was used to develop individual short-term events. The author of the study joined the group of co-developers in 2005, became the host of the first and all subsequent versions of the program "My Bright World", refined the gamified and event part of the program to its final form, became a co-developer and host of the programs "Magic Country" (annual) and "Fantastic Reality" (biennial), as well as the head of the game the department that developed and implemented the listed programs and international meetings and online tournaments, which became the experimental base of the study. To conduct the program implemented by the first, "My Bright World"

requires the least human resource (a homeroom teacher who has been trained, and /or a game technician teacher who has also been trained) and the widest possible range of formats of conducting: full-time, full-time limited, remote full, remote limited. The following is the process of developing the annual educational program "My Bright World" within the framework of the gamification approach.

2.1.1. Development of an annual educational game program based on gamification

With the annual adjustment of the program "My Bright World", the structure of the program remained unchanged: the presence of a gamified and event-based parts. The basic non-gaming process for which the game "My Bright World" was developed within the framework of the gamification approach is the process of cooperation within the framework of joint inside-class affairs and the process of cooperation within the framework of cases related to school events organized by the deputy director for educational work of the school, organizing teachers, librarians, subject teachers of the school. The order of development and structure of gamified programs correspond to the gamification methodology proposed by Professor K. Werbach of the University of Pennsylvania in 2011 during the online educational course "Gamification" [277]. In this course K.Werbach summarizes the experience of gamification of processes in various spheres of life, describes 6 steps of the method of gamification of any non-gaming process:

1. determine the goal, if there are several of them, then rank;
2. describe the desired behavior of the players;
3. describe the players (make some typical portraits of the alleged participants);
4. develop activity cycles;
5. do not forget about the interest;
6. use a suitable tool (meaning gaming).

Using these stages, in some cases clarifying them in the appendix to the educational process, as well as relying on the pyramid of gamification (see Figure 7), also proposed by K.In the course of

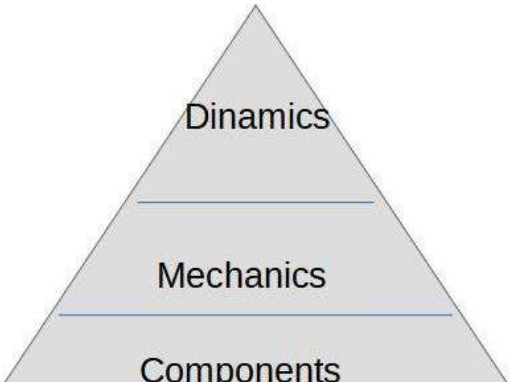


Figure 7. Three layers of gamification. The author is K.Werbach

"Gamification", we will briefly describe the development process and the structure of the program "My bright World".

Step 1. Define Goals

The main goal: to develop the ability to cooperate of each participant.

Important goals:

1. the program helps the class teacher in the development of the class as a self-organizing group,

3. the program promotes the activation and involvement of children in school extracurricular events,

4. the program promotes the formation of a positive atmosphere of cooperation in the classroom based on an interest in self-development.

Step.2 Describe the desired behavior of the participants

K. Verbach, with the help of whose methodology we present the development process and the structure of the program "My Bright World", suggests working within the framework of a behavioral approach, therefore, his method of gamification describes only behavioral aspects and environmental factors that can influence human behavior, cause certain reactions, actions. Without denying the importance of behavioral, active aspects of the ability to cooperate, we consider not only them. In accordance with the three-component structure of the ability to cooperate disclosed in Chapter 1 of this study, we have developed criteria and indicators for the development of the level of the ability to cooperate (see Table 4), a diary of pedagogical observation for classroom teachers and teachers (game technicians and the head of squad movements), leading and accompanying the program in each particular class and a questionnaire for participating children. The diary of pedagogical observation and the questionnaire for participants are presented in Appendixes 5 and 6, respectively.

Let us expand the characteristics of the levels of development of the ability to cooperate highlighted in Chapter 1 in accordance with the criteria and indicators presented in Table 4, as well as the highlighted phases of cooperation highlighted by E.A. Samoilov [196]:

1. coordination of motives;

2. goal setting;

3. orientation, distribution of roles, drawing up an action plan;

4. execution;

5. monitoring the results of joint activities;

6. correction of the result and presentation of the result.

Characteristics of the levels of development of the ability to cooperate:

1. Zero level. It is characterized by a lack of desire and attempts to communicate in the course of cooperation with both acquaintances and strangers. Cooperation cannot take place already at the stage of coordination of motives. That is, all levels of indicators according to the first criterion (orientation to

cooperation as a value in communicating with other people) are low. Evaluation of indicators by the second and third criteria is impossible, since there is no process of joint activity itself, or it is extremely rare and then the indicators are low.

Table 4

Components of the ability to cooperate, criteria, indicators and evaluation methodology

Criteria	Indicators	Indicator levels	Assessment methodology
Motivational and value component			
1. Focus on cooperation as a value in communicating with other people	Positive emotional attitude to situations of interaction with familiar people	Availability Absence	Pedagogical supervision in specially created and spontaneous situations, structured conversation
	Positive emotional attitude to situations of interaction with strangers	Availability Absence	
	The expressed inclusion of a person in the process of cooperation	High Middle Low	
	Responsible attitude to the result of joint actions	High Middle Low	

The continuation of the table 4

Criteria	Indicators	Indicator levels	Assessment methodology
Cognitive-reflexive component			
2. Perception and comprehension of their actions, actions of partners in the process of joint achievement of the goal	Readiness to describe and evaluate the behavior of partners in situations and circumstances of joint actions	High Middle Low	Pedagogical supervision in specially created situations, structured conversation, content analysis of texts of participants' reviews, questionnaire
	Readiness for self-assessment in situations and circumstances of joint actions	High Middle Low	
	Conscious replacement of unproductive activities with productive ones	High Middle Low	
	Willingness to comprehend the experience of cooperation	High Middle Low	
	Willingness to perceive and comprehend the circumstances of the cooperation partner	High Middle Low	

The continuation of the table 4

Criteria	Indicators	Indicator levels	Assessment methodology
Communication and activity component			
3. Productivity of communication in situations of joint activity	The level of involvement in all phases of cooperation	High Middle Low	Pedagogical observation in specially created situations, author's diagnostic games
	Consistency of agreements and actions	High Middle Low	
	Readiness to build communication in situations of cooperation in unusual communication conditions (game)	High Middle Low	

2. Low level. There is a willingness to contact, the attitude to the situation of interaction with acquaintances and strangers is positive or neutral, the ability to listen to the other is well developed, there are attempts to verbalize their thoughts, there is a willingness to take into account the position of the other. With the development of the ability to cooperate at a low level, coordination of motives is possible, a common goal is also most often understood, but there is no distribution of roles, responsibilities, actions to achieve the goal are chaotic, coordination of interaction is spontaneous. The goal can be achieved, but not in a rational way. When the time resource is limited or the method of communication is limited, the goal is most often not achieved. When discussing the results and the process of joint activity, the behavior of one's own and partners is often presented in an emotionally unconstructive form. There may be a desire to insist on your position, your vision of the situation, perceived as the only true one. The levels of indicators according to the first criterion are medium or high. The levels of indicators according to the second criterion are medium or low. The levels of indicators according to the third criterion can vary low or medium (there are more low ones).

3. The average level. At this level, the ability to plan actions, assign responsibilities, and follow a plan is added to the skills of previous levels. Conflict situations are resolved with varying degrees of success, mutual and self-control, control of the result of joint actions, mutual assistance, correction of

actions, presentation of the result. The levels of indicators for all criteria are average, there may be high (one or two indicators) and low (one or two indicators).

4. High level. This is the level we are aiming for at the middle level. All stages of achieving a joint result at a high level are carried out rationally: coordination of motives, goal setting, orientation, distribution of roles, execution, control of the result of joint activities, correction of the result and presentation of the result.

The levels of indicators for all criteria are high, there may be one or three average levels of indicators and none low.

Step 3. Describe the players

When developing the programs, the age characteristics of children, the present and prospective interests of adolescents in the use of communication and technical means were taken into account. The main language of the programs is Russian. When developing programs, we tried to avoid references to the specific cultural baggage of teenagers associated with their place of residence or to make these points variable, that is, easily replaceable during the implementation of the program. For example, in Kazakhstan, in schools where the main language for children is Kazakh, and Russian is used more often in everyday situations.

Step 4. Develop activity cycles

One of the features of the gamification approach is the fragmentation of the entire game into a series of engagement cycles, grouped into promotion cycles. The engagement cycle is a sequence of interrelated aspects of the game: the motivation of the participant, his actions and feedback. All game components are a feedback form. The scheme of the involvement cycle proposed by K. Werbach is shown in Figure 8.

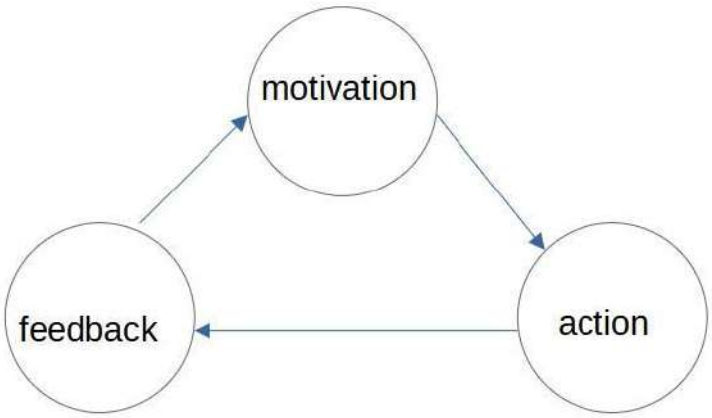


Figure 8. The scheme of the engagement cycle by K.Werbach

In the "My Bright World" program, such a small cycle is an intermediate team task, the performance of which is encouraged by a mark in the competition screen (see Appendix 4). Team tasks are naturally arising in the course of school life: assignment to the class to participate in the subject week, preparation for a school-wide event, inside-class organizational and creative events. The accumulation of three positive marks in the competition screen is an admission to the game event. A large cycle of involvement is one game stage, including 3-4 intermediate tasks, of which 2-3 can be chosen, and a game event. Successful or unsuccessful completion of a large stage is also reflected in the competition screen. A large cycle lasts, except for the first and final, 4-5 weeks. A small cycle can last from 1 day to 1 week. In the "Magic Country" program, the cycle structure is similar to the "My Bright World" program. During the player's journey through our game program (gamification), his experience grows, and the level of ability to cooperate increases, so the complexity of communicative tasks gradually increases. Increasing complexity is the general direction of progress in the game, but the increase in complexity is not linear, that is, the complexity increases variably. Consideration of this pattern is necessary when developing promotion cycles. K. Werbach calls this the curve of interest. At the very first stage, everything is easy, this stage is adaptation, then complication. "The model....It includes an ever-increasing difficulty, which is always followed by a relatively easy period, and then, at the end of each level, the player is waiting for the "main obstacle". In the program "My Bright World", such an obstacle is a game event lasting 1 hour, developed within the framework of the event approach. The cycle of promotion in the program "My bright World" is reflected in Figure 9.

In the "Magic Country" program, intermediate obstacles, being within the framework of general gamification, are not game events. For each stage, except the final one, the obstacle is a joint squad (intra-class) event, which is a series of tests. All tests are related to the knowledge and skills acquired by the guys in cooperation during the preparation. The final obstacle, also known as the final game event, is an inter-squad, that is, several classes participate in it at the same time, competing in solving some kind of communicative puzzle.

The structure of the program, reflecting the cycle of promotion of the game program "Magic Country", is shown in Figure 10. It differs from the program "My Bright World" by the number of stages and the fact that only the first and final tests are game events. Each of the programs "My Bright World",

"Magic Land" and "Fantastic Reality" is itself one of the steps in the cycle of promotion in the overall three-level four-year game.

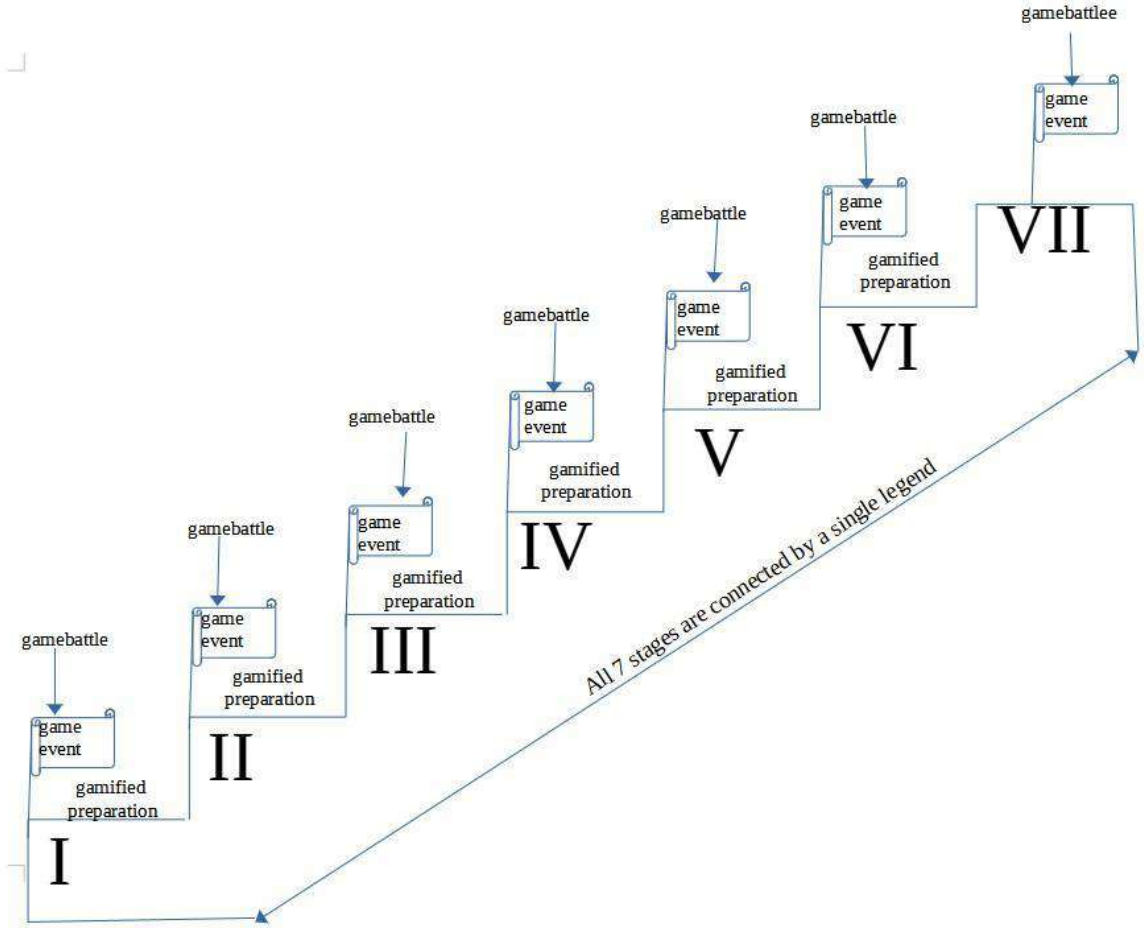


Figure 9. The structure of the program “My bright world”. The scheme of the promotion cycle of the game program in accordance with the methodology of K.Werbach

Step 5. Do not forget about the interest

Step. 6. Use a suitable game tool

The development of the legend of the game, the competition screen, stage game events completely take place at these two steps. In addition to interest, we also turn to all 14 elements of the game described in Chapter 1, establishing their relationship, thus working through and describing all the elements of the game at this and the next step. The sixth and fifth steps of the gamification methodology in the process of experimental search work were repeated annually. Based on the results of the survey of students, parents and conversations with the class teacher after each school year, we adjusted the content of stage events (game tests), clarified the proportion and variability of the gamified part. A similar process took place during the development of the "Magic Country" and "Fantastic Reality" programs. Their development also corresponds to the described method of gamification. The program "Magic Country"

was developed for 6 years (from 2006 to 2012), the program "Fantastic Reality" for 4 years (from 2007 to 2011).

The full description of the program "My bright World" in the form in which it was implemented in the 2013/2014 and 2014/2015 academic years is presented in Appendix 4, the description of the program "Magic Country" in Appendix 7, "Fantastic Reality" in Appendix 8.

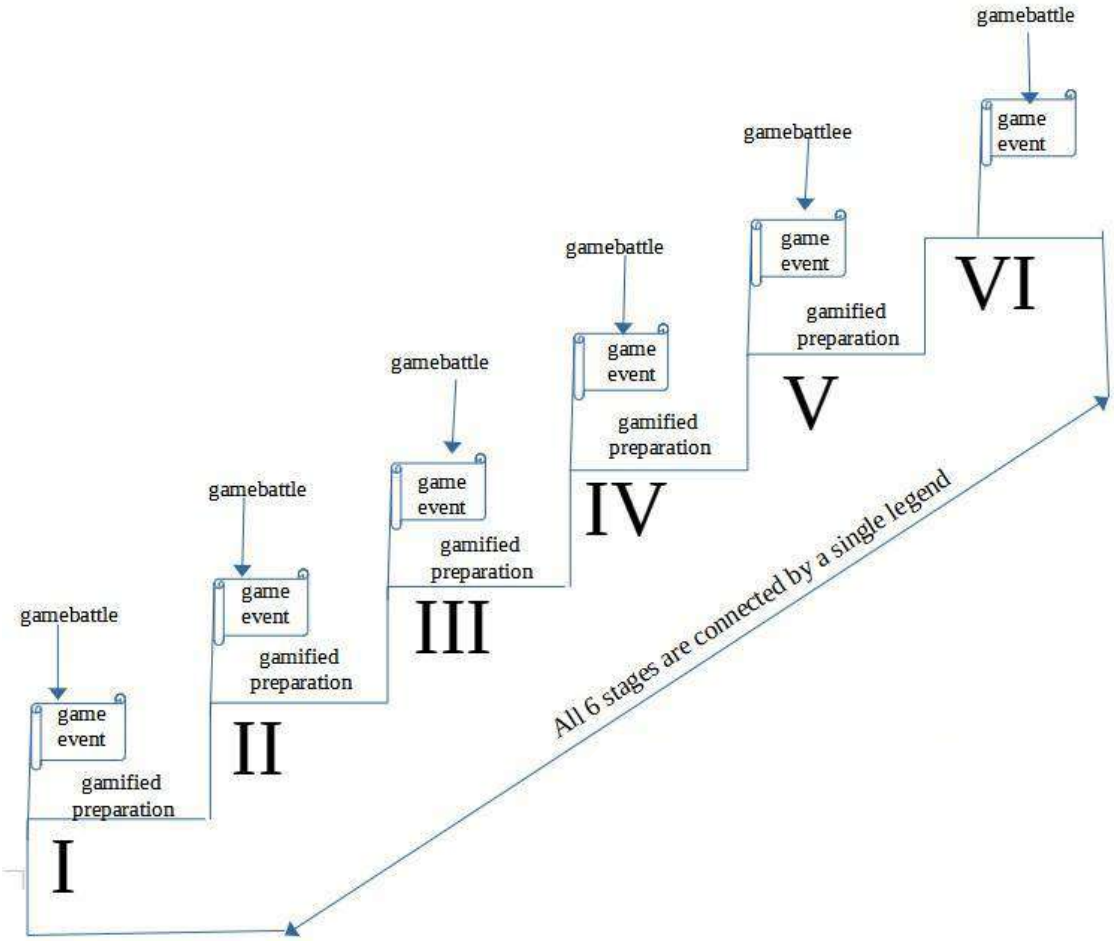


Figure 10. The structure of the program “Magic country”. The scheme of the promotion cycle of the game program in accordance with the methodology of K.Werbach

In accordance with the methodology of developing a game program within the framework of the gamification approach, when creating a promotion cycle, it is necessary to develop game obstacles with increasing complexity. In the case of the program "My Bright World" (as well as "Fairyland" and "Fantastic Reality"), such obstacles were individual games developed within the framework of the event approach. When developing games, we took into account the matrix - the morphological box of the group game, presented in Chapter 1. An important principle of development was variability: all games included in the program as game events did not repeat each other in structure by more than two parameters. That is, there was a variation in each layer presented in Chapter 1. Game communication in all games was different, namely the following:

- restriction on means of communication (speech, text on sheets, text via any messenger);
- restriction on the method of communication (words, pictures, gestures, facial expressions);
- the length of communication (divided into cycles, moves, continuous);
- freedom of communication with others (you can communicate with all players, there is free communication within the group, and there is something limited between groups) and other options.

An example of the development of one of the games with a description of the structure is presented in the appendix.

Experimental search work was also carried out on the ratio of the game event and gamified parts of each of the programs. In the program "My Bright World" and "Fantastic Reality", options were tested with the minimization of the gamified part (only the event part remained), with the inclusion of a small gamified part (legend, screen, game division into teams), and full gamification. The full version turned out to be the most optimal for maintaining interest in the program and obtaining the greatest efficiency in increasing the level of development of the ability to cooperate in the group.

Thus, game programs aimed at developing the ability to cooperate have been developed in accordance with the gamification methodology proposed by K. Werbach. The structure of the programs "My Bright World", "Magic Land" and "Fantastic Reality" are similar, differ in the number of stages, their length and the number of game events (tests). Game events are developed within the framework of the event approach, taking into account the layered matrix of the game (the morphological box of the game) proposed in the theoretical part of the study. During the development of the program, three criteria for the level of development of the ability to cooperate were also identified, indicators were proposed and evaluation methods were selected. The criteria are defined as: orientation to cooperation as a value in communicating with other people; perception and understanding of their actions, behavior and actions, behavior of partners in the process of jointly achieving the necessary goal; productivity of communication and interaction activities. Each of the criteria reflects one of the components of the ability to cooperate, identified and justified by the teacher-researcher M.Y.Zaitseva and clarified in this study: value-motivational, cognitive-reflexive, communicative-activity.

2.1.2 Methods of implementation of the annual game educational program "My Bright World"

The implementation of the annual program "My Bright World" - the first of a series of three consecutive programs is possible in four different forms: full-time, full-time limited, full-time remote, remote limited. Each of these forms assumes appropriate requirements for the preparation of a class teacher leading the program independently or in cooperation with a game technician teacher. Methodological recommendations for the organization and management of an extracurricular gamified annual program are set out in several articles by the author of the study [153, 157]. The methodology of the program implementation is the same for all four forms and assumes 5 cycles [144].

They involve people in the following positions:

- class teacher (in different educational organizations, he can be replaced by a class curator, a class tutor)
- a person who accompanies class students in the learning process and is engaged in the life of the class as a community (hereinafter, for simplicity, we will call the person in this position a class teacher);
- a game technician teacher is a person who has pedagogical and game technical training, conducts all game events during the program;
- head of squad movements. The class entering the program receives the status of a squad. In some cases, the composition of the squad does not match the composition of the class. The head of squad movements coordinates inside-squad and inside-squad game life, deals with squad life from the point of view of the development of the squad as a team, helps in the analysis and resolution of conflict situations within teams;
- gamemaster – developer of games for the task. A gamemaster is a higher level of development of the skill of a game technician teacher.

The author of the study spoke at different times in all these positions.

In the case of remote implementation of the position of a game technician, part of the position of the head of squad movements is assumed by the class teacher. We also had the experience of implementing the program, when the positions of the head of the squad movements and the game master were held by one person.

The total duration of the program is 1 academic year (9 months).

Tact 0. Preparatory

This tact goes beyond the scope of conducting the program itself, but is important in order for the conduct to take place. At this tact, the class teacher gets acquainted with the program "My Bright World" or undergoes training. Familiarization can take place within the framework of a 3-hour seminar, training - in a series of seminars or during a 5-day immersion. Training is necessary for inclusion in the process

of conducting the program by the class teacher and achieving the greatest result. The author of the study developed and conducted teacher training in the format:

- 6-day field methodological seminar from July 19 to 24, 2010, in Stary Oskol, Belgorod region. 21 people from Astana and Temiratau (Kazakhstan), Moscow, St. Petersburg and Pechora, Pskov region (Russia) took part);
- a series of 10 webinars for 1.5 hours (teachers from various cities of Russia and Belarus were trained);
- a series of face-to-face methodological seminars on the basis of schools, IMC and DDUT of St. Petersburg, Leningrad region, Vitebsk region, Moscow, Tver region (the "Teacher of the Future" shift of the All-Russian Forum "Seliger"), Chuvashia;
- advanced training course on the basis of the IMC Krasnoselsky district of St. Petersburg. The program of the advanced training course for 36 academic hours, the course program is presented in Appendix 11.

Tact 1. Making a request

Venue: educational organization. Duration: up to 1 week. Participants of the tact: students (members of the class team), parents (or legal representatives, in some cases representatives of the parents group, i.e. the parent committee), the class teacher, the head of the squad movements.

Step 1. Structured conversation with the class teacher about the specifics of the class. It is conducted by the head of the squad movements. See Appendix 12 for the issues discussed in the conversation.

Step 2. The conversation with the parents is conducted by the head of the squad movements in cooperation with the class teacher.

Step 3. Selection and/or development of a diagnostic game. The head of the squad movements in cooperation with the gamemaster.

Step 4. Sociometric research.

Step 5. Organizing and conducting a diagnostic game for participants with a post-game discussion (reflection), the game is conducted by the game master with a group of game technicians, the post-game discussion is conducted by the head of squad movements in cooperation with the game master.

Step 6. A conversation with the parents of the participants and the class teacher following the results of the diagnostic game. Separately, the results of a sociometric study are discussed with the class teacher to compile options for dividing into teams. Conducts a conversation with the head of the squad movements. The wording of the request from the parents

Tact 2. Navigation

Venue: educational organization, remote option is possible. Duration: 1 – 1.5 hours. Participants of the tact: parents of participants or legal representatives, class teacher, head of squad movements, game master.

Step 1. Presentation of game educational modules that are possible for inclusion in the game educational route of the class team in accordance with the request, interest. Game educational modules act in this technology as a resource for the realization of the interests of participants. The game master conducts it in cooperation with the head of the squad movements for the class teacher and parents.

Step 2. Selection of 5 game educational modules, if necessary, formulation of a request for the development of an additional module. The choice is made by the parents of the participants together with the class teacher.

According to the experience of the event, parents entrust the choice to the class teacher and the game master, only sometimes focusing on the special interests of children (for example, interest in detectives).

Tact 3. Formation of the game educational route of the class team

Venue: it does not matter, a distant option is possible. Duration: up to 1 month. Tact participants: homeroom teacher, game master.

Step 1. Determining the order of game modules in the route. It is carried out by the game master in cooperation with the head of the squad movements.

Step. 2. Selection of games within each module in accordance with the characteristics of the class team. If necessary, development or modification of ready-made game solutions. At the end of the step, the gamemaster draws up a table with the name of the games and the requirements for the organizational conditions for each of the game events.

Step 3. The selection of intermediate game team tasks for the first two stages is carried out by the head with the class teacher, if necessary, advises them or helps to develop a game master. For subsequent stages, intermediate team tasks are selected immediately before the start of the stage and depend on events in school and classroom life.

Step 4. Drawing up a schedule for the passage of the game educational route (the program "My bright world"), the head of the squad movements together with the class teacher.

Step 5. The interactive acquaintance of the participants with the route is conducted by the head together with the game technician teacher.

The result of the tact is an individual educational game route of the class team, divided into 7 stages. Each stage lasts 3-5 weeks, within the stage there are time limits for completing intermediate team tasks / cases / tests and a big game event.

Tact 4. Phased implementation (7 stages, 5 selected, the first and last stage are determined by the leader of the squad movements and the game master)

Venue: educational organization.

Duration of the 1st stage: from 3 to 5 weeks. Participants of the tact: participants, class teacher, head of squad movements, game master, teachers - game technicians.

The game educational route of the class team is divided into 7 stages. The implementation of each stage takes place according to the following algorithm:

Step 1. Division of the class team into teams of 4-6 people. It is carried out by the head of squad movements in cooperation with the class teacher. The division takes place in a playful way.

Step 2. Initial organization of teams: acquaintance, selection of the team name for the stage, selection of the team leader. Conducted by the homeroom teacher.

Step 3. Presentation to the teams of all intermediate team cases of the stage and the deadline for their completion. At each stage there can be from one to three intermediate command tasks (determined on the previous cycle). We strive to ensure that teams have a choice of tasks. Represents the homeroom teacher.

Step 4. Organization of teams to perform intermediate team tasks of the stage. Assistance in overcoming difficulties in team interaction. It is carried out by the head of squad movements in cooperation with the class teacher.

Step 5. Big stage game event. The event is organized and conducted by a game technician teacher or a group of game technicians teachers, if ready, this stage is carried out in cooperation with the class teacher.

Step 6. Reflection of the stage. Involved: children and a class teacher, conducted by the head of squad movements. At this step, the class teacher fills out a reflexive diary of pedagogical observations.

Step 7. The homeroom teacher receives feedback from interested and engaged parents.

Step 8. Organizational reflection of the stage. Participants: head of squad movements, homeroom teacher, game technicians, game master. Conducted by the game master.

Step 9. Selection of intermediate game team tasks for the next stage, taking into account the results of the last stage. It is conducted by the head of squad movements together with the class teacher.

Step 10. If necessary (taking into account the results of the previous stage), the gamemaster can make adjustments to the big game event of the next stage: replace or modify.

Tact 5. Final diagnosis

Venue: educational organization. Duration: up to 2 weeks. Participants of the tact: children, a class teacher, a leader of squad movements, a game master, a game technician teacher.

Step 1. Development/selection of the diagnostic final game. Conducted by the game master [145].

Step 2. Organizing and conducting a diagnostic game. It is conducted by a game master, a game technician teacher. They are monitored during the game: the homeroom teacher and the leader of the squad movements.

Step 3. Reflexive conversation with participants following the results of the program "My bright World".

Step 4. Questionnaire, filling in a self-observation sheet by each participant.

Step 5. A conversation with parents following the results of the program "My bright World" is conducted by the head of the squad movements in cooperation with the class teacher.

Step 6. Organizational reflection of the annual cycle: homeroom teacher, game master, head of squad movements, teachers-game technicians. It is conducted by the head of the squad movements.

At the start of the "My Bright World" program, we used a sociometric method to identify the structure of the class, the claims and sympathies of the participants. The sociometric survey was conducted in mid-September of each new academic year in the classes that applied for participation in the program. An example of the application is presented in Appendix 9. Technical processing and interpretation of the results obtained during the survey and analysis of the sociogram (finding the most influential members, determining whether the leaders of groups are positively or negatively interconnected, searching for mutual pairs, groups more often of 3, less often of 4 people) they relied on the work of I.P. Volkov [42]. The instruction text for the class teacher is presented in Appendix 10. The criterion of sociometric choice was the choice of classmates to move to a new class, as well as the significance of the opinion of another (whose answers to similar questions would be interesting to read). The number of elections was limited to 3. The results in the form of a sociogram of one of the participating classes are given in Appendix 13.

Sociometry data in accordance with the ideas of J.L. Moreno, the founder of sociometry, were used not only to analyze the actual state, but also to develop group relationships [131]. In particular, the researcher and the class teacher observed confirmations in the spontaneous actions of the participants of the expressed structure, which served as a starting point for further actions. The program "My Bright World" assumes division into small groups, teams within the classroom, such division occurs 7 times during the school year with a frequency of about once a month. Sociometry data were used to implement such a division. The principles of division were as follows:

- at the first stage, people with mutual positive sociometric connections get into one team. Soft division, closest to "complete non-interference" according to J.L. Moreno [131, p.88]. The choice of teammates was optional, the number of team members was limited (4-5 people), the inclusion of each participant in the distribution into teams was also declared a necessary condition;

- at the second and third stages, there are people in the same team who have mutual and non-reciprocal positive connections, but do not have negative ones. A variant of the democratic distribution according to L.J. Moreno [131, p. 88];

- at the fourth stage, there are people in the team who have non-reciprocal negative connections and people who show a minimum of connections with each other;

- at the 5th and 6th stages, there may be people in the team who showed mutual negative connections at the beginning of the program, and at these stages we continue to include people with a

minimum number of positive and negative connections. A variant of autocratic division [ibid., pp.88-89];

- at the final stage, the distribution into teams is random, a draw, or in the case of an acute conflict at the previous stages, randomness may be limited by the fact that the conflicting parties do not fall into the same team.

We used options for packing the division of teams into a kind of game legend or a small game, which resulted in a distribution into small groups. Some variants of the game methods of division into teams are presented in Appendix 14.

It should be noted that for the implementation of the program, the ability and desire of the class teacher to be in a game position, to play together with the children in the proposed game is important. During the implementation of the program in 70 classes, the program was conducted most successfully in terms of retaining interest in the game in classes with a teacher who did not reject the opportunity to play with children, who was interested in the intermediate results of children's games, who supported the legend and the external significance of the game. With such teachers, children aspired to move to the next level, wanted to participate in the "Magic Country" program and then in the "Fantastic Reality" program. In our study, there were 14 out of 70 such classroom teachers. The age range of these 14 teachers was from 25 to 60 years. The implementation methodology was developed to help teachers with a gaming position who undertake to independently implement the program or who want to be active co-hosts in cooperation with a game technician teacher. The success of the "step-by-step implementation" tactic is most dependent on the classroom teacher's game training.

So, the methodology of the implementation of the game program "My bright World" consists of 6 cycles: preparatory, request processing, navigation, formation of the game educational route of the class, step-by-step implementation, final diagnostics. The program is implemented from 4 positions: homeroom teacher, game technician teacher, head of squad movements, game master. Each stage is divided into steps for ease of implementation. Based on the results of the experimental search work, we recommend including the class in the program to those class teachers who can and want to be in a game position, who love this position and strive for its qualitative implementation.

2.2. The results of the implementation of gamification aimed at developing the ability to cooperate

The experimental results presented and interpreted below do not reflect the materials of all classes that participated in the described game programs in different years. This is due to the fact that in the early years of the development and maintenance of programs, not all classes recorded observational data in an obvious and suitable for processing form. And also in the early years, the experimental search work described in the previous paragraph was most active. Discussion of the course, structure and other features of the programs "My Bright World", "Magic Land" and "Fantastic Reality" and their intermediate and final results was constantly conducted with teachers, children, and parents interested and open to such discussions in order to improve the program, but not all data can be restored. Therefore, to present the results of the study, classes and years of participation have been selected, the materials of which can be obviously processed and interpreted. The item "Experiment lasting one academic year" presents the research material of the 2013/2014 and 2014/2015 academic years. During these years, the program "My Bright World" was implemented in all the developed implementation options and this is of interest. The item "Experiment lasting two academic years" presents the material collected in different periods in classes that have passed two levels, that is, two annual gamified educational programs "My Bright World" and "Magic Country", there were 11 such classes for all the years of implementation. The item "Experiment lasting four academic years" presents the results of three classes that have passed all three levels, that is, two annual programs "My Bright World" and "Magic Country" and one two-year program "Fantastic Reality". The item "Remote cooperation" presents the results collected in 2011 and 2012 related to the ability to cooperate remotely.

In the experiment, both the level of development of the ability to cooperate, individual and group, was evaluated. To assess the individual level of development of the ability to cooperate, the following methods were used:

- questioning of children,
- pedagogical supervision in educational and game situations,
- content analysis of a reflexive conversation with a child,
- content analysis of creative project products,
- content analysis of the reviews of the participants of the meetings (texts in free form). Content analysis was performed in accordance with the technique described by V.Y.Khotinets [237].

Methods used to diagnose the group level of the ability to cooperate (indicator for the class):

- A.N. Lutoshkin's methodology for assessing the level of development of the team (according to the description of the class by classroom teachers in a conversation), A.N. Lutoshkin characterized the level

of cohesion of the group by 5 levels: "Sandy placer", "Soft clay", "Flickering lighthouse", "Scarlet Sail", "Burning torch" [121, pp.97-113].

- survey of teachers.

Questionnaires for teachers are compiled taking into account the basic requirements for questionnaires used in pedagogical expertise, proposed by V.S. Cherepanov [248, p. 47];

- feedback from participating children;

- diagnostic games "TetraKom" and "Ritmograd". These are specially designed communication games. Both games were presented and discussed at pedagogical seminars and conferences, including the conference of the All-Russian Association for Games in Education at Moscow State University in November 2013, the St. Petersburg APPO methodological seminar in May 2016, seminars for teachers of the Krasnoselsky District IMC of St. Petersburg in 2015, a tutor conference at Moscow Pedagogical University in 2012, in Cheboksary, seminars for teachers of the city of Vyborg, Leningrad region, as well as at the pedagogical councils of several schools in St. Petersburg (GBOU middle school No. 380, GBOU Gymnasium No. 41, GBOU Middle School No. 554). As part of the advanced training course on the basis of the Krasnoselsky district IMC, a group of teachers proposed assessment maps for the development of universal educational activities based on the results of the game "RitmoGrad", including a map for assessing the level of participants' ability to cooperate during observation of them during this game, which was used during pedagogical observation.

- diary of pedagogical observations. The author of the study compiled an observation program in accordance with the methodology described by A.F. Kornienko [125]. In those cases when the program was conducted in the classroom by a game technician teacher and the head of squad movements in cooperation with the class teacher, each of them kept his own diary of observations. The teacher filled out this diary at the end of each stage of the program. The diary was first offered to teachers in printed form, and then it was translated into electronic form and offered in the format of a Google form. One of the options is presented in Appendix 5.

2.2.1. Experiments lasting one, two and four academic years

An experiment lasting one academic year

Table 5 shows the data of the 5th and 6th grades who participated in the 2013/2014 and 2014/2015 academic year in the program "My Bright World". Classes from Astana (Kazakhstan), Korolev (Moscow region, Russia), St. Petersburg (Russia), Kondopoga (Republic of Karelia, Russia), Leningrad Region (Russia), Novopolotsk (Vitebsk region, Belarus) took part. Only the annual program

"My Bright World" was held in these classes. The transition to the next level was not carried out for various reasons, among the reasons voiced by the class teachers were:

- all those who took part in the distance form did not have the opportunity to participate in the second level, since the second level presupposed the preliminary training of a teacher or the presence of game technicians at the venue leading the program together with the class teacher, the class teachers did not have the opportunity to study;
- the class teacher was not ready to take part in the second-level program due to his own heavy workload or personal circumstances;
- the class teacher considered that at this stage the level of development of the ability to cooperate, which they reached by the end of the school year, is enough for children;
- parents were against children staying after school or coming in extra time to participate in the program.

There were 19 such classes in the 2013/2014 and 2014/2015 academic years. This amounted to 499 children and 26 teachers: 20 teachers of schools, 4 teachers-game technicians, 2 leaders of squad movements. There are much more people with whom the organizers and presenters of the programs collaborated in the process of conducting: these are school principals, deputy directors for educational work, deputy directors for scientific and methodological work, teachers-organizers of the school, district methodologists and others. In the 2013/2013 academic year, we also tested the remote implementation option. 5 classes (4 classes from Korolev of the Moscow region and the 1st class from the village of Siversky of the Gatchina district of the Leningrad region) participated only in 2-4 stages. The main reason for the termination of participation class teachers called:

- the complexity of independent implementation;
- a large proportion of the intellectual component in games, a high level of difficulty for children.

We assume that the reason for the failure of the "My Bright World" program in remote form could be:

1. insufficient level of game competence of teachers (they did not undergo preliminary training and were familiar with the program only from text and video materials);

2. the choice of the option of conducting the program without a gamified component (teachers conducted only game events, the connecting gamified part was not implemented at the choice of teachers) – this could cause the loss of children's interest in the game as a whole;

3. external motivation of teachers to participate in the program without understanding the essence of the program or an administrative initiative. In Korolev, the initiator of joining the program was the deputy director for scientific and methodological work at the school, familiar with the programs for face-to-face seminars conducted by the author of the study. The class teachers got acquainted with the program in September of the year in which they started participating. It's late enough. According to the

feedback of the participating classroom teachers, it is advisable to get acquainted and learn how to conduct the program in May–August before the start of the school year or earlier.

The data of 5 (five) classes who dropped out of the programs on their own initiative are not taken into account in the presentation of further results. Of the 14 classes after the end of the "My Bright World" program, 8 decided to participate in the second level, that is, in the "Magic Country" program, by a joint decision of parents, children and the class teacher.

Table 5

Data on the participants of the "My Bright World" program in 2013/2014 and 2014/2015 academic years

№	City, country	Academic year	Educational organization	Class	Class-teacher	Number of participating children	Form of implementation
1	Novopolotsk, Vitebsk region, Belarus	2014/2015	Middle School No. 12	6 «A»	Golubeva Svetlana Fedorovna	27	The distance is full, the homeroom teacher leads
2	Kondopoga, Republic of Karelia, Russia	2014/2015	Middle school No. 3	6 «A»	Gorbunova Elena Evgenievna	21	The distance is limited, the cl. head leads
3	Pushkin, Saint Petersburg, Russia	2013/2014	Middle school №335	6 «G»	Ortikova Svetlana Gennadievna	31	The distance is limited, the cl. teacher leads
4	Astana, Kazakhstan	2013/2014	"Lyceum School 28"	5 «B»	Sergeeva Irina Petrovna	30	Full-time, game technician teacher together with cl.hands.
5	Astana, Kazakhstan	2014/2015	"Lyceum School №1"	5 «G»	Chulkova Natalia Yurievna	34	Full-time, game technician teacher together with class - teacher.
6	Astana, Kazakhstan	2013/2014	German school complex No. 46	5 «A»	Rakhmedyanova Ulzhan Ashimovn	23	Full-time, game technician teacher together with class - teacher.

					a		
Continuation of the Table 5							
№	**City, country**	**Academic year**	**Educational organization**	**Class**	**Class-teacher**	**Number of participating children**	**Form of implementation**
7	Saint Petersburg, Russia	2013/ 2014	Middle School with in-depth study of subjects of information technology profile N113	5 «A»	Shlenkina Natalia Nikolaevna	30	Full-time, game technician teacher together with class - teacher
8	Saint Petersburg, Russia	2013/ 2014	School with in-depth study of subjects of information technology profile N 113	6 «A»	Krokhin Sergey Anatolyevich	27	Full-time limited, the teacher is a game technician, the class teacher is sometimes present.
9	Toksovo, Vsevolozhsky district, Leningrad region, Russia	2013/ 2014	Toksovsky Center of Education	5 «A»	Nikulina Svetlana Sergeevna	23	Full-time, game technician teacher together with class-teacher.
10	Toksovo, Vsevolozhsky district, Leningrad region,	2013/ 2014	Toksovsky Center of Education	6 «A»	Khripunov Valerian Vladimirovich	15	Full-time limited, game technician teacher.

	Russia						
Continuation of the Table 5							
№	**City, country**	**Academic year**	**Educational organization**	**Class**	**Class-teacher**	**Number of participating children**	**Form of implementation**
11	Toksovo, Vsevolozhsky district, Leningrad region, Russia	2013/ 2014	Toksovsky Center of Education	6«B»	Kuzmina Tatiana Anatolyevna	17	Full-time full-time, game technician teacher.
12	Siversky settlement, Gatchinsky district, Leningrad region, Russia	2013/ 2014	Siverskaya Gymnasium	6 «B»	Brukhanskaya Elena Aleksandrovna	28	The distance, limited, leads class-teacher
14	Korolev, Moscow region, Russia	2013/ 2014	Gymnasium No. 11	6 «B»	Kolosova Marina Valeryevna	27	The distance, limited, leads class-teacher.
15	Korolev, Moscow region, Russia	2013/ 2014	Gymnasium No. 11	6 «A»	Novikova Irina Valentinovna	26	The distance, limited, leads class-teacher
16	Korolev, Moscow region,	2013/ 2014	Gymnasium No. 11	5 «A»	Kirillova Olga Yurievna	28	The distance, limited, leads class-

	Russia						teacher

Continuation of the Table 5

№	City, country	Academic year	Educational organization	Class	Class-teacher	Number of participating children	Form of implementation
17	Korolev, Moscow region, Russia	2013/2014	Gymnasium No. 11	5 «B»	Korovinskaya Galina Vladimirovna	25	The distance, limited, leads class-teacher
18	Saint Petersburg, Russia	2013/2014	Middle school № 91	5 «A»	The class-teacher changed twice during the school year.	18	Full-time, the teacher is a game technician.
19	Saint Petersburg, Russia	2013/2014	Middle School № 91	5 «B»	Ilyina Tatiana Valeryevna	17	Full-time, conducted by a game technician teacher

Of the 14 classes, the largest number of winners of the game "My Bright World" (for children, the program is a big annual game) is recorded in programs implemented in full-time and remote full form, that is, in a form with a gamified and game event part. In classes with full implementation, the number of winners varies from 50% to 73% of the total number of children in the class (10-17 people). In classes with limited implementation, the number of winners varies from 9% to 20% (2-6 people). The number of winners indicates the game effectiveness of the program to develop the level of cooperation, the level of interest in the program, since the program provides for the possibility of increasing the game status by improving results at the end of the school year, that is, a participant interested in winning can achieve a winning result if persevering, there is no limit to the number of winners in the game. Below are the results of the survey of children participating in full-time. There are 192 children participating in the survey in the proposed sample.

Consider a group indicator. According to the participating children, the level of ability to cooperate in the classroom has increased. In the conversation concluding participation in the program, more than 70% of children noted that classmates became more attentive to each other, it became possible to agree on something, it became interesting to communicate in class with everyone, there were remarks "finally we were able to do something interesting together", "it was nice to go to class come", "I got to know my classmates better and it became pleasant for me to communicate with them" and other phrases confirming the improvement of the atmosphere in the classroom. Table 6 shows the statistics of responses to the children's question "Assess the level of cooperation of your class as a whole" at the beginning and at the end of the program.

Table 6

Assessment of the level of the ability to cooperate of their class by students

After the first stage			After completing the program		
High	Middle	Low	High	Middle	Low
0 people	61 people	131 people	20 people	97 people	75 people
0%	32%	68%	10%	51%	39%

According to all 8 classroom teachers, in which the program was implemented in full form, the level of ability to cooperate in the classroom has increased. Children began to be interested in the affairs of not only their closest 2-3 friends, but also other classmates, in the second half of the school year, circles of 5-6 talking children began to appear at recess, intermediate tasks for the sixth stage of the team were done by all 5 classes out of 8 with minimal organizing help from the class teacher, unlike the initial three stages. In the diary of pedagogical observation, the final question in an open form is "How did the program "My Bright World" affect the class team?" the class teachers noted that the program "made friends with the children", during the program the children "learned to hear each other", "learned to negotiate in a team", "learned to accept the opinion of classmates", "learned to plan work in a group and distribute responsibilities". Three class teachers out of the eight indicated noted that the level of ability to cooperate has increased, but children still cannot communicate with any person from the class, it was not possible to overcome some conflict relations and antipathy between several children stretching back from elementary school, which still prevents them from negotiating independently, this happens only under the control of an adult (in at the beginning of the school year and under the supervision of an adult, there was a refusal to cooperate). The class teachers who joined the program in a limited form (6 people) found it difficult to compare the level of development of the ability to cooperate in their class before and after the program. For those classes in which the program was conducted full-time, this assessment was

also made by a leading teacher-a game technician. In three classes, the game technician teacher did not observe an increase in the level of development of the ability to cooperate, relations in the classroom remained tense.

All classes who completed the program "My Bright World" in full-time, coped in the diagnostic games "TetraKom", "Ritmograd" and the final game "My Bright World" with puzzles, which were a cooperative game task that must be solved jointly by the whole class, having previously agreed. In these games, different degrees of communication restrictions are used (in "TetraKom" correspondence without the possibility of direct communication, in "RitmoGrad" free communication in order to compare a sufficiently large number of facts for children without the possibility of recording, in the final game "My Bright World" communication between teams is carried out through a "negotiator"). Methodological development of diagnostic games is presented in Appendices 15 and 16. The implementation of the game "TetraKom" involves the installation of a specially developed program on a computer or other technical device, "My Bright World" is a board game, "RitmoGrad" is a cabinet communication game. Of the classes participating in the "My Bright World" program in a limited form (that is, without a gamified part), 3 classes out of 4 failed to cope with team puzzles.

The game "TetraKom" was held separately for the participants of the contest "Factory of Excellent Students" (at different times for 16 teams of 6th, 7th, 8th and 9th graders), not a single group of participants coped with this team puzzle the first time. The game "Ritmograd" and similar ones about the structure of the game with another legend and facts were held for students of grades 8 "A", 8 "B" and 8 "C" of the GBOU middle school 380 school in the 2015 academic year, for teams of classes participating in the competition "Factory of Excellent Students" (12 teams at different times), for students of the program "My bright world" in the middle of the school year as a diagnosis in five grades. Out of 20 exercises, 2 classes/teams coped with the puzzle. These 20 groups served as control groups for our study, that is, groups in which the "My Bright World" program was not conducted. Note that the level of intellectual complexity in both games is available to the 5th grader. And in the absence of restrictions on the method of communication or reducing the number of participants to 5 with whom it is necessary to negotiate, the puzzle becomes trivial, which was noted by all participants during the post-game discussion. It is the level of development of the ability to cooperate in a team that determines the success or failure of the team in these diagnostic communication games.

Consider the individual level of development of the ability to cooperate. To identify the individual level of development of the ability to cooperate, the author of the study, together with the class teacher, filled out a questionnaire at the beginning of the school year, representing the methodology for assessing the level of the ability to cooperate. The methodology was developed by the author of the study and is presented in Appendix 17. These questionnaires were filled out only for the participating classes from St. Petersburg, in which the author of the study acted as a game technician teacher leading the program

together with the class teacher. There were 5 such classes in total, 105 children took part in this stage of the study. The assessment was made after the first stage game, since before it the class might not have had a precedent of the observed cooperation process, and after the final stage. The data on the assessment of the individual level of development of the ability to cooperate are presented in Table 7.

Separately, it should be noted that 4 children showing a low level of cooperation skills at the entrance to the program increased their level to a high one (that is, they took two steps on this scale), the other children moved 1 step towards growth, and none lowered their level of cooperation skills.

Table 7

Assessment of the individual level of the ability to cooperate with the class teacher and the game technician teacher

At the beginning of the program (after the first stage game)				At the end of the program (after the final stage game)			
High	Middle	Low	Zero	High	Middle	Low	Zero
13	34	51	7	32	55	18	0

When assessing the individual level of development of the ability to cooperate according to the results of pedagogical observation, 62 out of 105 children had an increased level of development of the ability to cooperate, which is 59% of all participants. The change in the level of development of the ability to cooperate is presented in comparative diagrams 1 and 2.

Figure 11 shows the percentage ratio of the number of participants who have increased the level of development of the ability to cooperate from zero to low, from low to medium, from medium to high,

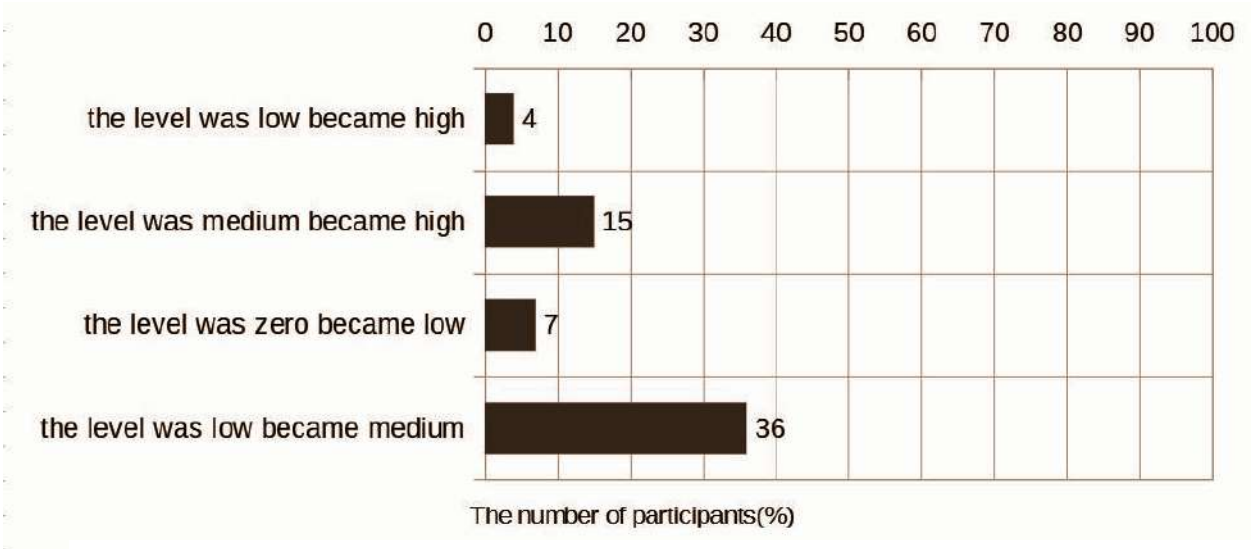


Figure 11. The diagram “ Changes in the level of development of the cooperative ability”

and participants who have left their level unchanged based on the results of participation in the annual game program.

Figure 12 shows the percentage of the number of participants whose indicators have increased for each of the three criteria. Criterion 1 - orientation to cooperation as a value in communicating with other people, corresponds to the motivational and value component, according to this criterion, growth was noted in 55% of participants. Criterion 2 - perception and comprehension of their actions, the actions of partners in the process of joint achievement of the goal, corresponds to the cognitive-reflexive component of the skill, the growth of indicators according to this criterion was noted in 77% of participants. Criterion 3 – productivity of communication in situations of joint activity, corresponds to the communicative and activity component of the skill, there is an increase in 55% of participants. 18% of the participants have an increase in all three criteria.

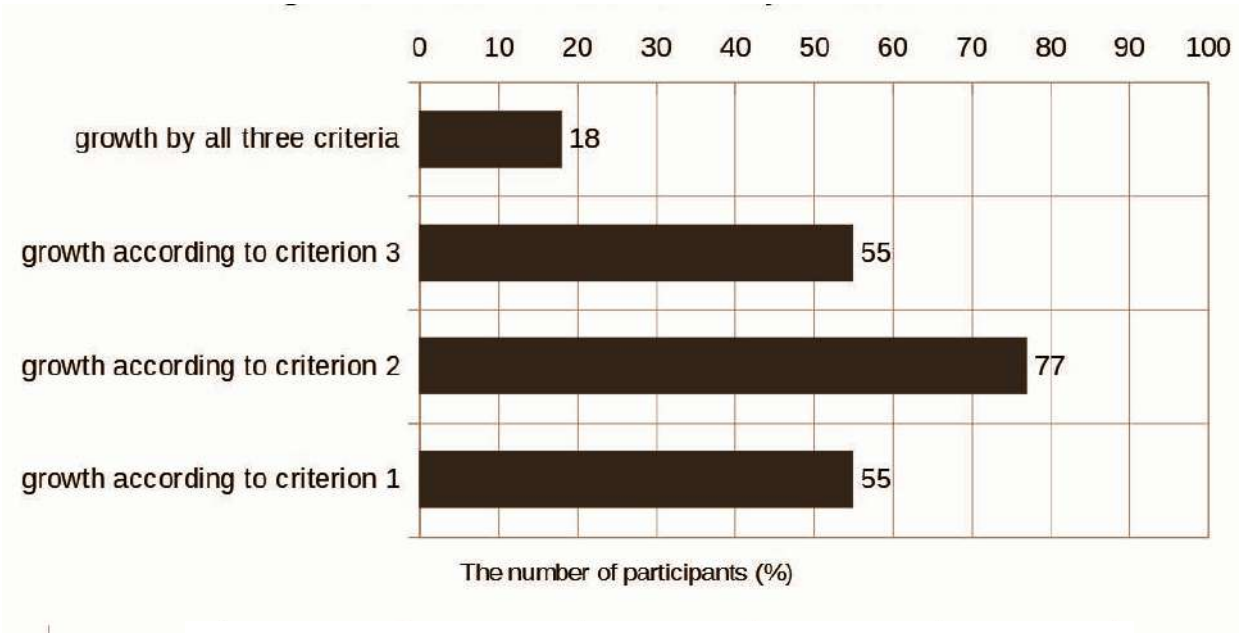
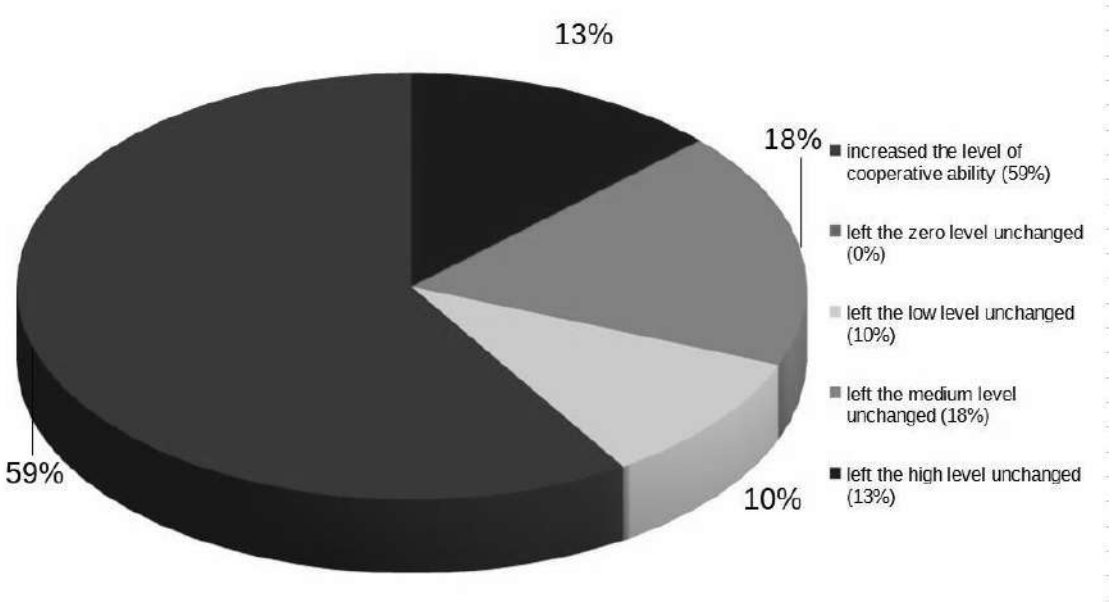


Figure 12. The diagram “Growth of indicators by various criteria”

Figure 13 shows the percentage of participants who have increased the level of cooperation development (by levels) and left the level unchanged according to the results of the game program.



The gamified part has a decisive influence on maintaining the interest of children in the program, gives additional experience of cooperation, in most cases it is the experience gained in the gamified part

Figure 13. The diagram “Changes in the individual level of cooperative ability based on the results of participation in the game program during one academic year”

that is necessary for the successful completion of stage-by-stage game tests by participants, also related to the application and development of the ability to cooperate. The implementation of the program without the gamified part has little effect on the level of development of the ability to cooperate of an individual, but it can give interest to further self-development in this direction to each individual and the group as a whole. The full implementation of the program increases the level of cooperation among adolescents by at least one level, that is, from the zero level there is a transition to a low level, from a low level to an average level, from an average level to a high level, and also gives an increase at a high level in 1-3 indicators. The ability to cooperate after the "My Bright World" program, a teenager is able to apply in play, work and learning with classmates. In order to apply the ability to cooperate in any open, friendly group, further work on the development of this skill is required. From the point of view of the group indicator of the level of development of the ability to cooperate, the gamified program "My Bright World" gives the greatest result when using its full version, that is, with the inclusion of the gamified part. The result of participating in the "My Bright World" program for the class as a whole is to create a more pleasant and friendly atmosphere in the classroom by the end of the school year. Participants become more attentive to each other's opinions, are ready to listen to suggestions, the first three phases of cooperation are successfully completed in the proposed training and game tasks: coordination of motives, goal-setting, orientation and distribution of roles; the stage of execution and correction of the result (conscious replacement of unproductive activities with productive ones) and

subsequent stages of cooperation may cause difficulties, bringing educational and game tasks to completion. There is an active core of 10-12 children in the class who are ready to help the class teacher in organizing joint class affairs, in preparing the whole class to participate in school events.

An experiment lasting two academic years

Table 8 shows the data of classes that have passed two levels, that is, they took part in the program "My Bright World" and "Magic Country". In all these classes, the implementation of the program "My Bright World" was carried out in its full version, the program was conducted in close cooperation of the game technician teacher, the head of squad movements and the class teacher. The transition to the second level was carried out at the request of the class teacher, children and parents. The "Magic Country" program was also implemented by game technicians together with classroom teachers. There are 292 children in total, 11 classroom teachers, as well as 2 leaders of squad movements, 3 teachers-game technicians.

In the "Magic Country" program, we invited participants to engage in more complex teamwork compared to the "My Bright World" program. Each stage, except for the first and final sixth, lasted one month and involved the preparation and implementation of a team creative and educational project by the participants. Each stage consisted of training, the distribution of responsibilities in the implementation of a common project, work on the project (dance, performance, voiceover of a film excerpt, photo collage), presentation of results. The first stage was introductory, took place in the format of a 5-hour game with a lunch break, the final stage in the format of a 5-day remote team game. Attempts to conduct the "Magic Country" program without implementing the "My Bright World" program with the desire and participation of the class teacher in 3 cases (3 classes of the school where the author of the study worked and the schools of the program participants) ended with the refusal of most of the children to cooperate with each other within the team, which led to the suspension of the program. Thus, the game program "My Bright World" helps in developing the ability to cooperate and prepares children for cooperation not only in the game, but also in creative and educational projects, since children with experience of participating in it easily passed the first and second stages of the "Magic Country" programs.

Three attempts to implement the "Magic Country" program in the classrooms in which the "My Bright World" program was held, but the class teacher did not participate in the "Magic Country" program in two cases also led to a breakdown (some of the children were not released by their parents, it was difficult for someone to agree on the first-the second stage in the team, some children refused to participate after the first stage, citing employment). We assume that the implementation of the "Magic

Country" program, which includes team events that are more complex from the point of view of coordination of interaction, is impossible without the participation of a teacher who communicates with children on a daily basis and participates in the implementation of the program. A homeroom teacher for the implementation of the second-level program is needed as a person organizing teams, helping to resolve conflicts and coordinating the participation of children, including explaining the essence of the program to parents.

Also an important component is the game position of the teacher. It is important that the homeroom teacher plays "Fairyland" with the children. According to the observations of the author of the study, the game technicians and the head of the squad movements, in the participating classes, the number of children and parents interested in the results of the program was directly dependent on the teacher's interest, his involvement in the gameplay, in maintaining the legend and entourage of the game throughout the school year.

Consider a group indicator. According to the results of the implementation of the "Magic Country" program, all 11 classroom teachers noted the development of the class as a team. In accordance with the steps proposed by A.N. Lutoshkin, 8 class teachers defined their class in a free description in the conversation as a "Flickering Lighthouse", and 3 class teachers as a "Scarlet Sail". At the beginning of the school year, the classes, according to the description of teachers, were at the stage of "Soft Clay" and "Flickering Beacon", respectively, before the start of the program "My Bright World", 9 out of 11 classroom teachers described their class in accordance with the level of development of their classes as "Sandy placer", 2 - as "Soft Clay". That is, according to the results of participation in two programs, the level of the class as a team on this scale increased by two or three points. In the questionnaires, class teachers noted that during the program, the children became friends, learned to see and hear each other, coordinate their actions with each other, are ready to organize themselves and prepare to implement a small independent business, the core of the class asset has become more influential compared to 1 year of participation and expanded to 15 people, the classroom has a friendly atmosphere. In the final game of the "Magic Country" program, 208 people out of 292 successfully completed tasks related to cooperation, which is 71%.

Table 8

Data on classes that became participants in two consecutive game programs "My Bright World" and "Magic Land"

Venue	Academic year	Educational organization	Class	Classroom teacher	Number of participants in the "MBW"/"ML" program
Saint Petersburg, Russia	2008/2009 and 2009/2010	School № 394	5 и 6	Vinogradova Antonina Petrovna	24/ 24
Saint Petersburg, Russia	2008/2009 and 2009/2010	School № 394	6 и 7	Volodchenko Tatiana Viktorovna	26/ 26
Saint Petersburg, Russia	2011/2012 and 2012/2013	School № 369	5 и 6	Volskaya Tatiana Anatolyevna	24/ 18
Saint Petersburg, Russia	2012/2013 and 2013/2014	School № 534	5 и 6	Vinogradova Anna Mikhailovna	24/ 24
Saint Petersburg, Russia	2009/2010 and 2010/2011	School № 505	6 и 7	Putsima Nina Mikhailovna	32/ 32
Astana, Kazakhstan	2010/2011 and 2011/2012	"Lyceum School No. 1"	6 и 7	Tulepbergenova Dina Dosymovna	31/ 31
Astana, Kazakhstan	2010/2011 and 2011/2012	School №54	5 и 6	Ulzhalgas Serikovna Kazybayeva	34/34
Sestroretsk, Saint Petersburg, Russia	2009/2010 and 2010/2011	School № 433	6 и 7	Semenova Olga Alekseevna	27/27
Saint Petersburg, Russia	2010/2011 and 2011/2012	School № 683	5 и 6	Barkalova Victoria Alexandrovna	24/24
Pesochnoye, Saint Petersburg, Russia	2010/2011 and 2011/2012	School № 437	5 и 6	Khamina Irina Anatolyevna	24/24
Saint Petersburg, Russia	2007/2008 and 2008/2009	School № 217	6 и 7	Ignatenko Diana Anatolyevna	20/18

An experiment lasting four academic years

Three classes took part in gamified programs aimed at developing the ability to cooperate (see Table 8). The author of the study was the homeroom teacher of one of these classes, in the other two classes the programs were implemented with the direct participation of the author of the study as a co-developer and co-host of the teacher-game technician. A total of 57 children and 3 classroom teachers took part.

At the start of the experiment in these academic years, the sociometric study by the homeroom teacher was conducted only in 6 "B" of school No. 217 (the homeroom teacher is the author of the study). And on its basis, the division into teams was carried out according to the principles described above. Other classroom teachers described the class as a group during a structured conversation and the data was also used to divide into teams. The conversation plan included the following questions:

1. class as a collective (group relations, level of self-organization, level on the scale of A.N. Lutoshkin);
2. positive and negative leaders in the class;
3. the presence of constantly conflicting groups, people;
4. cooperation in the group (attitude to situations of cooperation within the group, the level of ability to cooperate).

The first two years of participation of all classes confirm the results of participation in the programs "My Bright World" and "Magic Country" described above, according to group and individual indicators.

Table 9

The data of the classes that took part in three programs are presented: "My Bright World", "Magic Land", "Fantastic Reality"

City	Academic year	Educational organization	Class	Class - teacher	The number of people participating in the program. "MBW"/ "ML" / "FR".
Saint-Petersburg	from 2005/2006 to 2008/2009	School No. 217 Krasnoselsky district	6 «B» - 9 «B»	Oleinik Iuliana Pavlovna	22/21/18
Saint-Petersburg	from 2005/2006 to 2008/2009	School No. 534 Vyborgsky district	5 «S» - 8 «S»	Vinogradova Anna Mikhailovna	26/24/15
Saint-Petersburg	from 2006/2007 to 2009/2010	School No. 527 Nevsky district	5 «A» - 8 «A»	Kutenkova Tatiana Vasilyevna	28/28/24

It is interesting in this experiment to participate in a two-year program of the third level. 8 "B" School No. 217 and 7 "W" School No. 534 simultaneously began participating in the "Fantastic Reality" program. 7 "A" School No. 527 joined a year later. The first year of the program was gamified. During the year, the participants consistently worked on three projects to create video clips, animated pictures, presentations, studying the work of various editors at game seminars. Gamification consisted in the access of participants-players to an online store in which components for a virtual computer were "sold" for bonus points earned inside the game "Fantastic Reality". Promotion in the implementation of the team project allowed participants to make purchases in this store. Each participant collected a computer for himself, and it was possible to earn points only when promoting teamwork. After the defense of the project, the team composition changed according to the principle of drawing lots. Also, the statuses of players who were beaten at face-to–face gaming seminars (two-day gaming events) were introduced, the player's status growth was laid in the game (Cake-KiloCake - MegaCake-TeraCake-.....-YotaCake). For more information, the program is presented in the Appendix 8. The first year of the program was designed according to the method of gamification

described above. The effectiveness of the program in terms of involvement in it from beginning to end exceeded 80%: 49 out of 57 participants successfully coped with all projects, all 57 people participated until the end of the game. The class teachers noted a high interest in the program throughout the school year, interest in their class, the creation of a friendly working atmosphere in the classroom during the lessons, the desire for cooperation and outside of participation in the program. The level of the teams according to the assessment of the classroom teachers was close to the "Scarlet Sail" on the scale of A.N. Lutoshkin. Even those guys who could not participate in the program for some reason (most often due to the schedule of additional classes) were interested in what was happening, acted as fans and enthusiastic observers, sometimes assistants. The results of the projects were interesting for both children and were positively evaluated by parents. In the second year of the Fantastic Reality program, it was decided to offer the guys a longer-term project: a six-month project to create a website on any topic agreed with the teacher of any subject in their school. Pedagogical councils were held with teachers working in these classes, where the content of the program was presented, since not only game technical and organizational, but also substantive support from teachers teaching various subjects was required. In two grades 9 "B" and 8 "W", this process was not gamified, that is, game training seminars were held, and the rest of the time the guys worked on creating their website, receiving remote consultation if necessary. The significance of the game status was not played out, the online store did not work for level 2 participants. For 7 "A" who joined the Fantastic Reality program and the second year was gamified, that is, in addition to game events held in the format of two-day training seminars, activity in the development of their own projects was gamified. Result: in classes in which there was no gamification, 2 teams reached the end of a long project (in one class at the start of the program there were 6 teams of 3-4 people, in the second class there were 7 teams of 3-4 people). In the class in which gamification worked for the second year, 6 teams out of 8 who started reached the completion of the project and protection. By the fourth year of participation, the ability to cooperate among most participants was at a high level, this is evidenced by the game result at the end of the third year of participation. Teams for the implementation of long-term projects were formed at the request of the participants. In one of the classes, an objective factor influencing the low effectiveness of the program was the change of the class teacher, the new class teacher was not interested in and did not participate in the program, a decrease in free time due to preparation for certification exams (grade 9 "B" of school No. 217), the lack of support of school teachers in the meaningful preparation of projects (class teacher, who was the author of the study, could no longer constantly contact teachers, the new class teacher did not want to do this). In 8 "S" 534 schools, children's projects were supported by two teachers (a computer science teacher and a literature teacher – a class teacher), projects made on the subjects of these teachers were completed,

that is, the result of the fourth year and in this class is close in effectiveness to the result of 9 "B". This fact confirms that gamification supports the interest of teenagers in long-term joint affairs, stimulates the process of cooperation and thereby contributes to the experience of cooperation, and therefore contributes to the development of the ability to cooperate. It is also important that in order to create meaningful situations for older adolescents, all factors are important: the status inside the game, the significance of the result and outside the game (support of teachers), the significance of the process and results for parents. The children who completed the projects later actively participated in the organization of school events in grades 9-11, participated in the management of the programs "My Bright World" and "Magic Country" for 5-7 graders of their own and other schools, participated in international gatherings as assistants to the heads of international detachments. These children showed a high level of ability to cooperate both remotely and face-to-face with unfamiliar peers and people older than them in a different age group. 8 "B class in full participated and became winners of the district class competition, under the guidance of the class teacher, having prepared (script, scenery, musical accompaniment, dance, etc.) and played the play "Immunity". Perfomance was their semi-annual project, not related to participation in the game program, but high self-organization and the need to do interesting things together were the result of participation in these gamified programs. In the 8th "A" grade of school 527, the second gamified level, with a small but existing support of subject teachers, as well as a modified gamified one, ended with the best game result: 5 teams out of 8 defended their projects. This class for a 4-year journey from the 5th grade, assembled from two warring 4th grades, whose representatives refused to even sit at the same table with each other, daily arranging group fights at recess or after school (both girls and boys), gradually transformed into a friendly class, capable of self-organization. In grades 9-11, no longer participating in programs, they were engaged in organizing inside-school events, worked on school-scale projects, participated in district and city competitions that require a high level of ability to cooperate.

A comparison of the results of an experiment lasting one, two and four academic years shows a direct relationship between the duration of the implementation of gamification with an increase in the level of ability to cooperate on an individual indicator. In the case of a four-year implementation, the level of cooperation skills of gamification participants increases to at least an average level in 100% of cases. There is a strong correlation between the duration of participation of classroom groups in the gamified program and the percentage of participants with a high and average level of ability to cooperate (see Figure 14). The correlation coefficient is equal to r=0.957.

The size of the effect of the influence of the gamified program on increasing the individual level of the ability to cooperate to high and average in one academic year is d= 2.55 with a standard deviation SD = 20.904, calculated on a sample of 10 control classes (307 people). The effect size of

more than 0.4 is a high indicator for school annual achievements, and more than 1 is significantly high, which was confirmed during a meta-analysis of J. Hetty's pedagogical research [241, p. 22-24] The calculations are given in Appendix 19.

Thus, four-year participation in gaming programs increases the level of ability to cooperate to a high level in 62.5% of participants, to an average for all remaining participants. When replacing the gamification approach with an event-based one, the effectiveness of the program decreases by 32.5% within one year. The ability to cooperate, which develops as a result of the participation of the game programs "My Bright World", "Magic Land", "Fantastic Reality", is used by teenagers in the future when working together outside the framework of participation in the program.

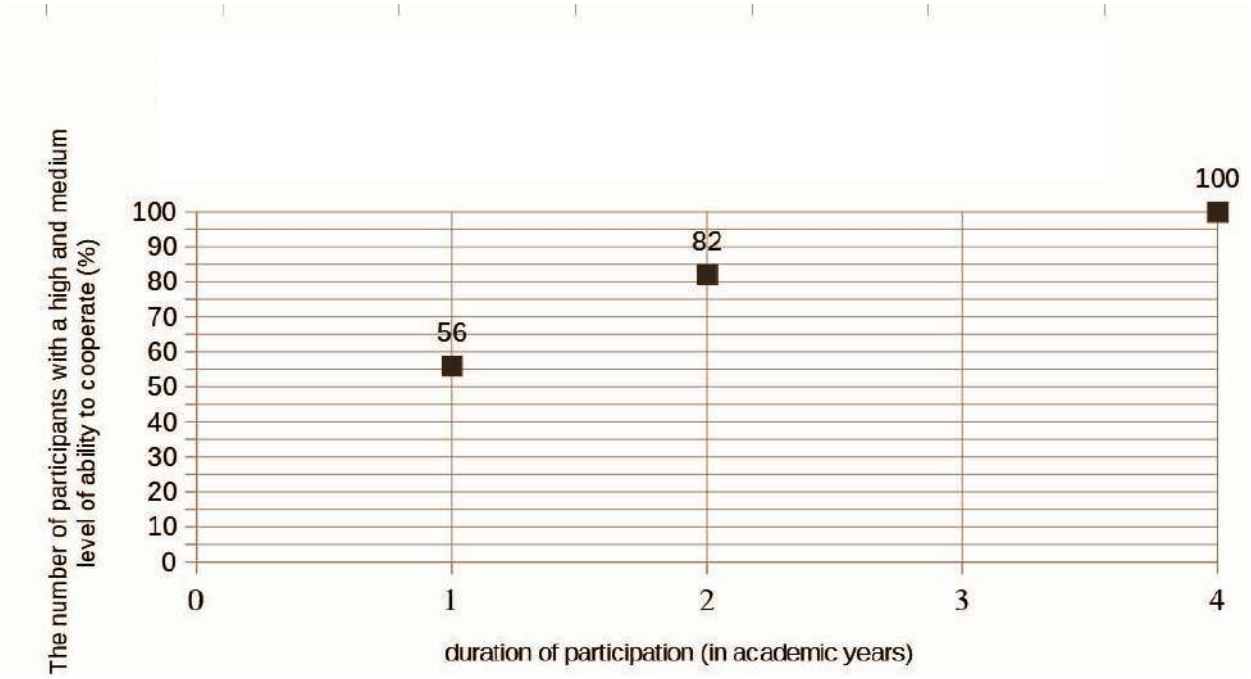


Figure 14. The diagram “The dependence of the number of participants with a high and medium level of a cooperative ability on the duration of participation in the gamified program”

2.2.2. Diagnostics of the ability to cooperate in face-to-face and remote joint activities in a multi-age group

From 2005 to 2015, international children's and youth gatherings were organized and held (see Appendix 2 for a list), in which both children participating in the described annual programs and other children aged 11 to 17 years, including those brought up in boarding schools of the Pskov Region, participated.. We used the emerging situations at the rally to observe and diagnose the level of development of the ability to cooperate of the participants of the program "My Bright World", "Magic Land" and "Fantastic Reality".

Rally "Empire of Friendship: Pskov battles". Dates: from 30.10.2010 to 06.11.2010 (travel of participants is not included in the dates of the rally). Number of participants: 61 children and 16 adults (teachers, game technicians, the head of squad movements, the head of the rally). Of the 61 children, 35 were children who successfully (that is, became winners of the game program) completed participation in the "My Bright World" program, 20 of them participated in the "Magic Country" or "Fantastic Reality" program at the time of the rally. The geography of the participants of the rally, both children and adults: St. Petersburg, Vitebsk, Novopolotsk (Vitebsk region, Belarus), Astana (Kazakhstan), Pechory (Pskov region), Pskov. The rally was attended by children from middle schools, gymnasiums, lyceums, Pechora boarding school for orphans and Krasnogorod boarding school for orphans. The program of the rally assumed life in detachments of different ages (from 12 to 16 years) composition, participation in creative projects, communication games. All the children previously knew that there would be a division into squads, the order of division into squads according to the rules of the meetings is known on the first day of the meeting at the general gathering (in the first 2 hours of the start of the meeting). Of the 35 children who completed participation in the gamified educational programs "My Bright World", "Magic Land", all children positively perceived the division into squads and on the first day of the rally actively joined in joint squad affairs, then were the engines of squads in all creative projects and communicative team games. Out of 26 other children:

- 3 refused to be included in the program on the first day (they remained in the position of observers for 2 days, being included only in regime moments, then gradually began to communicate with children, in team games they were in the position of an observer, in the last days of the rally they were fully involved in the action),
- 2 children were asked by their parents to pick up from the rally immediately after the division into squads (they did not have time to get acquainted with their compatriots, after a conversation with

teachers and parents they stayed, did not get involved in the action in the first days, then participated in some cases),

- 5 children were also actively involved in the life of the squad, 10 were participants of past rallies and were actively involved in all the affairs of the squads from the first day,
- the remaining 9 made up an "inert" mass of detachments, that is, they took the division into detachments calmly, but did not show initiative, hardly responded to calls for active action when preparing projects.

It should be noted that there was no special selection of children participating in the rally. Those children whose parents supported the participation of children were traveling. From boarding schools for orphans, according to teachers, children came for whose behavior "teachers will be calm and not ashamed" (Pechora boarding school) and children "who require special pedagogical attention" (Krasnogorod boarding school). The observation of the children was carried out by the author of the study (the head of the program of the described rally) and teachers – leaders of detachments. The inclusion of children in squad life was discussed daily at pedagogical meetings.

The rally "Empire of Friendship: Journey to the center of Europe", from 29.03.2010 to 03.04.2010, venue – Novopolotsk, Vitebsk region, Belarus. Number of participants: 36 children and 13 adults. The smallest rally, the reason for the small number is the unexpected transfer of the venue of the rally due to organizational inconsistencies in the actions of the city administration, in which it was previously planned to hold, and the discrepancy in the timing of spring holidays in Russia, Belarus and Kazakhstan. The rally was held according to the terms of the holidays of Belarus. The geography of the participants of the rally: St. Petersburg, Vitebsk, Novopolotsk (Vitebsk region), Polotsk (Vitebsk region), Astana, Pechory (Pskov region). Of the 36 participating children, 13 completed participation in the "My Bright World" program. 12 participated in the "Empire Friendship" program for the first time. All 13 children participating in the "My Bright World" program showed an average and high level of cooperation development ("development" level and "skill" level). Of the remaining 23 children, 4 stopped participating in the program after two days of the program (their parents took them away), the announced reason was "not interesting", the reason according to the observations of teachers was that they could not get involved in the work of different age groups, did not delve into the essence of the matter, did not want to contact unfamiliar children, instead of squad business they constantly tried to leave to communicate with acquaintances people. 14 children in the course of the unfolding were involved in all the events of the squad life, 5 children remained in the position of observers or inactive, but participating children.

The meeting "Astana: Hi-Tech-a fairy tale". Dates: 01.07.2010 to 11.07.2010. Geography of the participants of the rally: St. Petersburg, Vitebsk, Novopolotsk (Vitebsk region), Polotsk (Vitebsk

region), Astana, Pechory (Pskov region). Number of participants: 78 children + 23 adults. Of the 78 children, 16 are successful graduates of the programs "My Bright World", "Magic Country" and "Fantastic Reality" (8 people were participants in two or all three programs, 8 are graduates of only the program "My Bright World"). The structure of the program was designed in such a way that 8 children (graduates of two or three programs) during the 7 days of the rally daily switched to the time of performing creative project work and participating in communicative team games changed the squad, that is, daily from 8.00 (general formation of squads) to 21.30 they became members of other squads. They got into the squad in twos or threes, these twos and threes were also replaceable. In the evening, they had a general gathering under the guidance of teachers, an exchange of emotional impressions, and also discussed the productivity of their squad's cooperation on a particular day and their personal involvement and contribution to the process of cooperation in the squads. On the remaining days of the rally, these 8 people lived as a single unit. They were also watched by teachers, leaders of detachments. All children (their ages ranged from 13 to 15 years) showed a high level of development of the ability to cooperate and the ability to interact with peers in the age group of different ages (from 11 to 17 years) and adults. In the conversations, the children noted the complexity of the initial contact with children of another culture (it was about interaction with children from Kazakh schools for whom Russian was studied as a foreign language), about options for resolving conflict situations that arose in the detachments, about pleasant impressions from communicating with a large number of people, about positive emotions from a good result of teamwork.

Here is the result of a content analysis of the feedback from the participants of one of the most numerous in terms of the number of participants of the international children's and youth gatherings "Empire of Friendship". The task of content-analytical research is to determine whether there is a connection between a positive emotional attitude to the situation of cooperation with peers in a different age group (12-16 years) and participation in the game program "My Bright World", and also to determine whether there is a relationship between a positive attitude to the situation of cooperation and the effectiveness of joint activities. The analysis was carried out manually, since the qualitative unit of the analysis content was the judgment that at this stage of the program processing of the document it is impossible to entrust the machine. We were interested in judgments related to the productivity of communication within the group. Questionnaires and oral reviews were analyzed in individual conversations of participants of the international children's and youth rally "Empire of Friendship: St. Petersburg - the capital of naval glory" (January 2-9, 2010). Number of participants: 162 people, including 31 adults and 131 children from 12 to 17 years old; 29 successful graduates of the My Bright World program. Geography of the participants of the rally: Russia (St. Petersburg, Moscow, Penza, Pskov, Pechory (Pskov region), Krasnogorodsk (Pskov region), Pitkyaranta

(Republic of Karelia), Kazan, Yelabuga, Chistopol, Nizhnekamsk, Naberezhnye Chelny, (Republic of Tatarstan), Leningrad region); Belarus (Vitebsk, Novopolotsk (Vitebsk region), Polotsk (Vitebsk region)), Republic of Kazakhstan (Astana, Almaty, Shchuchinsk, Temirtau, Baikonur). Quantitative units of content analysis: feedback from the participants of the rally, written on the final day in free form. It was suggested to write a review about their participation in the rally in a free form, each person was given an A4 sheet. Conversations were also held on the final day of the rally before the departure of the participants, with those who did not write a review or wrote 2-3 sentences. A total of 131 reviews were analyzed.

Coding instructions:

A. communication and attitude to it

A1. Positive attitude to the fact of distribution to different age groups in the proposed way

A2. Negative attitude to the fact of distribution to different age groups by the proposed method

A3. Positive mention of the result of joint activity in the unit

A 4. Negative mention of the result of joint activity in the unit

A 5. Positive attitude towards the leaders of the squad

A 6. Negative attitude towards the leaders of the squad

A 7. Positive mention of the facts of communication in the squad during the rally

A 8. Negative mention of communication in the group in the rally squad

A 9. Mention of conflicts in squad

B. Living conditions

B1. Positive mention of the living conditions of living together

B2. Negative mention of living conditions of cohabitation

This instruction has been verified with the help of a trial content analysis:

- for stability. The data obtained by five different encoders of 10 different documents gave the same result;

- the validity of the choice of the content of semantic units and their completeness. The semantic units were approved by an expert group, which included teachers-game technicians, leaders of squad movements and class leaders of participating classes. The completeness of the proposed semantic units was determined by the analysis of 158 reviews from participants of the two previous meetings.

The results of statistical processing according to criterion A (communication) are presented in Table 10.

Semantic units with an even number show a positive attitude, with an odd one – a negative one.

For content analysis, Ch.In 1959, Osgood developed a methodology for analyzing the dependence of content elements to calculate the joint occurrence of various elements in the text. In

accordance with this methodology, the joint occurrence of two independent content units is recorded, their number is calculated and the randomness or non-randomness of their joint appearance is determined [237, pp.17-18]. Two types of judgment content were selected for the calculation using this method:

1. positive attitude to the fact of the distribution of familiar children among themselves in different squads and to the fact of cooperation with strangers;
2. positive attitude to the result of joint activities.

That is, the semantic units A1 and A3. The probability value of the appearance of judgment A1 is 49.6%, A3 is 58.8%. Let's compare the actual frequency of finding these two judgments together – 44 times, which is 33.6% , probabilistic – 29.2%. The actual value is higher than the probabilistic value, which means that the joint manifestation of these two judgments is not accidental (see Table 10). This means that a positive attitude to the situation of cooperation with strangers is likely to lead to a productive result of cooperation. Let's clarify that 65 people reacted positively to the fact of the proposed distribution to detachments, of which 29 people are graduates of the My Bright World program (all 57 who participated in the rally) and 36 people are participants of previous gatherings of the “Empire of Friendship”.

Table 10

The results of statistical processing of the feedback from the participants of the meeting according to criterion A (communication in the group)

A Communication		
Semantic unit	Quantity	% correlation
A1	65	49,6
A2	30	22,9
A3	77	58,8
A4	34	26
A5	70	53,4
A6	10	7,6
A7	44	33,5
A8	18	13,7
A9	4	30,5

According to the same methodology, the dependence of two elements was analyzed (see Table 11):

A 4. Negative mention of the result of joint activity in the detachment

B2. Negative mention of living conditions of cohabitation

Table 11

Actual frequency of finding judgments A4 and B2 together

A4	B2	The actual value of A4 and B2	Probability value A4 and B 2
26	30,5	16,8	7,9

The living conditions at this gathering were really quite unusual for almost everyone. Children and adults lived in rooms designed for a joint stay of 50 – 80 people (rooms of cadets of the Naval School located in the Admiralty building in St. Petersburg). The actual value is higher than the probabilistic value, which means that the joint manifestation of these two judgments is not accidental. The possible dependence of these judgments: in case of failures of joint actions, the negative perception of all accompanying factors is aggravated, these two judgments determine the general emotional unwillingness to interact with strangers. According to the observations of teachers, the most acute problem of communication with unfamiliar children and the general problem of interaction in detachments was manifested in children from the group that came from the Republic of Tatarstan and some children from the Republic of Kazakhstan who had not previously participated in programs aimed at developing the ability to cooperate. Moreover, the children were intellectually and creatively developed, some of them were winners of various regional intellectual and creative team competitions and activists of social movements, but they were ready to communicate only with those with whom they came, in the first three days refusing attempts to interact with people new to them.

Thus, in situations of joint activity with unfamiliar children in the age group from 11 to 15 years, teenagers who successfully completed the program "My Bright World" and successfully completed participation in two programs "My Bright World" and "Magic Land", in 100% of cases showed a high level of ability to cooperate (64 people out of 64). The control group consisted of randomly selected teenagers who were diagnosed with the ability to cooperate in the same situations. 43% of teenagers showed a high and average level of ability to cooperate (7 - high; 1 4-average). Content analysis of the feedback from the participants of the meetings showed that a positive attitude to the situation of cooperation with strangers is likely to lead to a productive result of cooperation. Such a positive attitude is formed in the course of gaining experience of cooperation with as many different people as possible, which is ensured by participation in the programs "My Bright World", "Magic Country". Let's clarify that 65 people out of 131 reacted positively to the fact of the proposed distribution to detachments, of which 29 people are successful graduates of the My Bright World program and 36 people are participants of previous meetings of the Empire of Friendship. That is, in

case of successful completion of participation in the "My Bright World" program, a positive attitude is formed to the situation of cooperation with unfamiliar peers in a different age group (12-16 years old).

In order to determine the impact of the level of development of the ability to cooperate in person on the level of development of remote cooperation, online meetings and online tournaments "Incredible, but a fact ..." were organized for participants of the programs "My Bright World", "Magic Land", "Fantastic Reality" and for all comers (see Appendix 3). The online meeting was a three-day gamified team competition in performing creative and intellectual tasks. Every day, teams were offered three game tasks, the performance of each of the tasks required the distribution of responsibilities within the group, coordination of actions, collecting the results of each team member's actions to obtain a single common product. The tasks were opened for the team's access gradually in accordance with the completion of the previous task, in addition, it was possible to get access to bonus tasks. An online tournament is a similar one-day game. The team's product could be a number of photographic images, combined audio or video recording, text, painting, collage, etc. – they were evaluated by judges according to pre-known criteria, also located in different cities. The publication of creative products by the participants was available for viewing and commenting to all participants. To carry out communication, it was allowed to use all available means. Skype, VKontakte, ooVoo, e-mail, and in very rare cases mobile communication were used for communication by participants. The condition for the registration and participation of the team in both the online tournament and the online rally was the remote removal of team members from each other: of the three people in the team, all three had to be in different cities, if there were 4 people in the team, then two could be in the same city, but live in different districts (not within walking distance from each other). Since each team had participants from St. Petersburg (Russia) and Astana (Kazakhstan) living in different time zones, each team had a time gap of 3 hours. In some teams there were also participants from Vitebsk or Novopolotsk (Belarus), thus the time difference between the participants within one team increased to 4 hours. The teams were coordinated by teachers-game technicians who were in touch on Skype and in contact during the rally. The total number of people who took part in online meetings and tournaments is 141 people. Of them successfully completed participation, that is, during all the game days, the teams presented a certain product created as a result of remote communication - 100 people. The composition of all teams that left the game route ahead of schedule consisted of more than 50% of participants who did not take part in the "My Bright World" program. Teams that successfully completed online gaming competitions consisted of more than 50% of participants who successfully completed the "My Bright World" program in the previous year or two years earlier (that is, 2 out of 3 team members or 3 out of 4 team members were participants in the "My Bright World" program).

The winning teams and the teams that took 2nd and 3rd places in the ranking included participants who personally knew each other and had experience of successful face-to-face cooperation within the framework of the Empire of Friendship program.

Here are the results of structured conversations with participants of online meetings and tournaments (see Appendix 18), 71% of participants of online meetings, quickly passed the first phases of cooperation (coordination of motives, goal setting, orientation of the situation and distribution of roles / responsibilities), spending no more than 1 hour on them, they discussed the time to get in touch the day before or even earlier. These were the children who had experience of participating in the "My Bright World" program. Their main efforts were focused on the passage of 4-6 phases of cooperation (execution, control of the results of joint activities, correction and presentation of results). Teams consisting of 2-3 people out of 3-4 who had no experience of participating in the "My Bright World" program spent the main game time on the 2-3 phase of cooperation and did not have time to move on to the 5-6 phases – this accounted for 29% of all participants. Three days before the start of the online game, a game technician contacted each registered participant, spoke the rules of participation, made sure that participation was voluntary and the person understood the essence of the game. All participants were explicitly advised to agree on the time to get in touch with each other in advance. Note that in 2011-2012. not all children of grades 6-8, and these were the main participants of online tournaments and rallies, actively used the Internet, and in Belarus in most cases children were forced to go to the post office in order to send an email with attachments: photos or videos, video communication by children during online rallies was used rarely. There are representatives of Belarus in the winning teams of all online tournaments, that is, this difficulty with communication with a child can be overcome if desired and proper self-organization. These data can serve for the following conclusion: for adolescents aged 12-16, the ability to cooperate face-to-face directly affects the level of remote cooperation skills, they are directly dependent on each other. Based on these data, it cannot be concluded that the result of the team that did not reach the end of the tournaments, that is, at some point stopped providing communication products, was influenced only by the level of ability to cooperate in person. The team members in conversations with the organizers of the competition called the reasons for the failure: "parents decided to leave and take me with them", "poor communication", "couldn't think of anything", "overslept and didn't get in touch at the agreed time, and the team members didn't get in touch at other times" and others. 83% of the participants who successfully completed the competitions noted in conversations with the organizers that these online competitions for them are a meeting with friends, with good acquaintances and with pleasant people.

Thus, it can be concluded that personal acquaintance and preliminary experience of successful face-to-face cooperation positively affects the productivity of remote cooperation. In our study, remote cooperation without the experience of face-to-face cooperation in adolescents aged 12-15 years could not take place and was interrupted at the stage of distribution of roles and responsibilities in the performance of a common cause. The ability to cooperate remotely in adolescents is directly dependent on the ability to cooperate in person. Determining a more precise relationship between the level of development of the ability to cooperate face-to-face and the level of development of the ability to cooperate remotely requires additional research.

Conclusions on Chapter 2

Chapter 2 presents the results of the experimental search and experimental part of the study. The experimental and search part consisted in the gradual development and 7-year refinement of three game programs, each of which lasts one or two years. The programs are continuous in relation to each other. During these 7 years, the program "My Bright World" was adjusted after each year of implementation in accordance with the information collected during the survey of children, conversations with classroom teachers, parents' feedback, theoretical research of the author and the gradual expansion of theoretical and practical works devoted to the issues of gamification in various spheres of life. When developing educational programs, two approaches were used, which in the theoretical chapter were identified as the most suitable for creating communicative educational games: gamification and event-based. The gamification approach was the main one, the event approach was used to develop individual short-term events. The author of the study joined the group of co-developers in 2006, became the host of the first and all subsequent versions of the program "My Bright World", refined the gamified and event part of the program to its final form, became a co-developer and host of the programs "Magic Country" (annual) and "Fantastic Reality" (biennial), as well as the head of the group teachers-game technicians who have developed and implemented the listed programs and international meetings and online tournaments, which have become the experimental base of the study. To conduct the program implemented by the first, "My Bright World" requires the least human resource (a homeroom teacher who has been trained, and a game technician teacher who has also been trained) and the widest possible range of formats of conducting: full-time, full-time limited, remote full, remote limited. The programs are consistent in relation to each other in terms of the complexity of game forms and communicative tasks. The participants of these three consecutive programs can be middle school students from 5th to 8th grade or from 6th to 9th grade.

Game programs aimed at developing the ability to cooperate have been developed in accordance with the gamification methodology proposed by K. Verbach. The structure of all three programs are similar, differ in the number of stages, their length and the number of game events (tests). Game events are developed within the framework of the event approach, taking into account the layered matrix of the game (the morphological box of the game) proposed in the theoretical part of the study. During the development of the program, three criteria for the level of development of the ability to cooperate were also identified, indicators were proposed and evaluation methods were selected. The criteria are defined as: orientation to cooperation as a value in communicating with other people; perception and understanding of their actions, behavior and actions, behavior of partners in the process of jointly achieving the necessary goal; productivity of communication in joint

activities. Each of the criteria reflects one of the components of the ability to cooperate: value-motivational, cognitive-reflexive, communicative-activity. To develop the ability to cooperate, situations that are significant for a person are necessary, such situations for a teenager can be games.

The methodology of the implementation of the game program "My bright World" consists of 6 cycles: preparatory, request processing, navigation, formation of the game educational route of the class, step-by-step implementation, final diagnostics. The program is implemented from 4 positions: homeroom teacher, game technician teacher, head of squad movements, game master. Each stage is divided into steps for ease of implementation. Based on the results of the experimental search work, we recommend including the class in the program to those class teachers who can and want to be in a game position, who love this position and strive for its qualitative implementation.

The experimental work consisted in assessing the level of development of the ability to cooperate face-to-face and remotely of participants in annual programs. The programs were tested in 70 classes of 28 educational organizations in Russia, Belarus and Kazakhstan as part of extracurricular activities in the middle school. To assess the individual level of development of the ability to cooperate in person and remotely, the following methods were used: questionnaires, pedagogical observation in game and non-game situations, content analysis of participants' feedback. Methods used to diagnose the group level of the ability to cooperate (indicator for the class): A.N.Lutoshkin's methodology for assessing the level of development of the team (according to the description of the class by classroom teachers in conversation), questioning teachers, content analysis of children's feedback, pedagogical observation, diagnostic communicative games developed by the author of the study.

The results of the experimental work are presented in five parts:

- **an experiment lasting one academic year.** The materials of this experiment are presented on the example of classes that participated in the "My Bright World" program in the 2013/2014 and 2014/2015 academic years. During these years, the program "My Bright World" was implemented in all developed formats: full-time and limited and remote full and limited. 499 children and 26 teachers took part. Five classes dropped out of the experiment after the implementation of one or three game stages, the reason was the insufficient game training of classroom teachers who took up the implementation of the program in a remote form. The implementation in full-time and remote full forms, in which the gamified part of the program is fully represented, turned out to be more effective than the limited form (using mainly the game event part), which was confirmed by a relatively large number of winners of the program in the first case 50-73% with full implementation and 9-20% in the second case.

When assessing the group level of the ability to cooperate, more than 70% of children in reviews and conversations noted that classmates became more attentive to each other, it became possible to agree with each other, there were other judgments confirming an improvement in the atmosphere in the classroom and an increase in the level of development of the ability to cooperate in a group. When assessing the group level of the ability to cooperate in the classroom, only 8 class teachers out of 14 were confident in its growth, these were those and only those class teachers in whose class the program was implemented in full-time and distance form, that is, with the presence of a gamified part. All classes that completed full-time participation showed an average and high level of development of the ability to cooperate in its assessment using diagnostic communication games. When assessing the individual level of development of the ability to cooperate according to the results of pedagogical observation, 62 out of 105 children increased the level of development of the ability to cooperate. The gamified part has a decisive influence on maintaining the interest of children in the program, gives additional experience of cooperation, in most cases it is the experience gained in the gamified part that is necessary for the successful completion of stage-by-stage game tests by participants, also related to the application and development of the ability to cooperate. The implementation of the program without the gamified part has little effect on the level of development of the ability to cooperate of an individual, but it can give interest to further self-development in this direction to each individual and the group as a whole. The full implementation of the program develops the ability of adolescents to cooperate at one level, that is, from the zero level there is a transition to a low level, from a low level to an average, from an average to a high, and also gives an increase at a high level in 1-3 indicators. For the formation of the ability to cooperate to a high level of "Skill", only participation in the gamified program "My Bright World" is not enough. The ability to cooperate after the program "My bright world" 56% of teenagers are able to confidently apply in the game and learning with classmates (medium and high level).

- an experiment lasting two academic years. This part presents the material collected in different years (from 2007 to 2012), based on the material of the consistent participation of classes in two programs: "My Bright World" and "Magic Country". In total, 292 children took part in this part of the experiment, 11 classroom teachers. Only the group indicator was evaluated. According to the results of the implementation of the program "My Bright World" and "Magic Country", all 11 classroom teachers noted the development of the class as a collective of one (2 teachers) and two steps (9 teachers) in accordance with the steps proposed by A.N. According to Lutoshkin, according to the pedagogical observations of classroom teachers, it can also be concluded that participation in two consecutive programs implemented in full form is more effective than in one. Since, according

to the results of participation in one program, the shift in the level of development of the team on the Lutoshkin scale was only 1 step for all teachers.

- an experiment lasting four academic years. The results obtained on the basis of the participation of 3 classes in all game programs developed using the gamification approach: "My Bright World", "Magic Land" and "Fantastic Reality" from 2006 to 2011 are presented. A total of 57 children and 3 classroom teachers participated. The experiment confirmed that gamification significantly supports the interest of teenagers in long-term joint affairs, stimulates the process of cooperation and thereby contributes to the experience of cooperation, both positive and negative, and therefore contributes to the development of the ability to cooperate. To create meaningful situations for older teenagers, all factors are important: the status inside the game, the significance of the result and outside the game (support of teachers), the significance of the process and results for parents. Four-year participation in gaming programs increases the level of ability to cooperate to a high level in 62.5% of participants, to an average for all remaining participants. When replacing the gamification approach with an event-based one, the effectiveness of the program decreases by 32.5% within one year. The ability to cooperate, which develops as a result of the participation of the game programs "My Bright World", "Magic Land", "Fantastic Reality", is used by teenagers in the future when working together outside the framework of participation in the program.

There is a strong correlation between the duration of participation of classroom groups in the gamified program and the percentage of participants with a high and average level of ability to cooperate.

- an experiment related to the assessment of the level of development of the ability to cooperate face-to-face in a multi-age group. In situations of joint activity with unfamiliar children in the age group from 11 to 15 years, teenagers who successfully completed the program "My Bright World" and successfully completed participation in two programs "My Bright World" and "Magic Country", in 100% of cases showed a high level of ability to cooperate (64 people out of 64). The control group consisted of randomly selected teenagers who were diagnosed with the ability to cooperate in the same situations. In the control group, 43% of adolescents (21 out of 49 people) showed a high level of ability to cooperate. Content analysis of the feedback from the participants of the meetings showed that a positive attitude to the situation of cooperation with strangers is likely to lead to a productive result of cooperation. Such a positive attitude is formed in the course of gaining experience of cooperation with as many different people as possible, which is ensured by participation in the programs "My Bright World", "Magic Country". Let's clarify that 65 people out of 131 reacted positively to the fact of the proposed distribution to detachments, of which 29 people are successful graduates of the My Bright World program (all 57 who participated in the rally) and 36 people are

participants of previous gatherings of the Empire of Friendship. That is, in case of successful completion of participation in the "My Bright World" program, a positive attitude is formed to the situation of cooperation with unfamiliar peers in a different age group (12-16 years old);

- an experiment related to the assessment of the level of development of the ability to cooperate remotely confirmed that personal acquaintance and preliminary experience of successful face-to-face cooperation positively affects the productivity of remote cooperation. In our study, remote cooperation without face-to-face acquaintance in adolescents aged 12-15 could not take place and was interrupted at the stage of distribution of roles and responsibilities in the performance of a common cause. The ability to cooperate remotely in adolescents is directly dependent on the ability to cooperate in person. Determining a more precise relationship between the level of development of the ability to cooperate face-to-face and the level of development of the ability to cooperate remotely requires additional research.

Thus, participation in the "My Bright World" program develops the ability to cooperate face-to-face, focuses on the value of cooperation with both acquaintances and strangers. Consistent participation in the programs "My Bright World" and "Magic Land" gives the experience of productive full-time and remote cooperation, develops the ability to cooperate and contributes to the development of the ability to cooperate to an average level ("Development" level), in some cases, to a high. Consistent participation in three programs and their successful completion develops the ability to cooperate to a high level (the "Skill" level), allows a person to engage in cooperation face-to-face and remotely with a productive result. To maintain the involvement of more children in the game program, not only the event part is necessary, which serves as some kind of test and experience for them, but also the gamified part. The gamified part allows you to keep activity at a high level for a long period, in our case 4 academic years, which provides the child with a diverse experience of cooperation and comprehend it.

Thus, within the framework of the gamification approach, three gaming programs have been developed - gamification for teenagers, which can be consistently implemented for 4 years in extracurricular activities in middle school. Gamification is aimed at developing the ability to cooperate face-to-face and remotely. With the help of a series of experiments, the effectiveness of the developed gamifications in the development of the ability to cooperate in adolescents has been proved, which means that gamification is a means of developing the ability to cooperate in students in extracurricular activities in middle school.

Conclusion

In accordance with the purpose of the study, a theoretical and experimental substantiation of the gamification approach of designing games as a means of developing the ability to cooperate in adolescents was carried out. For this:

- a structural characteristic of the ability to cooperate is given. The ability to cooperate has a three-component structure: a value-motivational component, a cognitive-reflexive component, and a communicative-activity component. In accordance with them, the criteria for the level of development of the ability to cooperate are highlighted: orientation to cooperation as a value in communicating with other people; perception and understanding of their actions, the actions of partners in the process of achieving goals together; communication productivity in situations of joint activity.
- the specifics of the ability to cooperate in modern society are defined: scalability – the ability to cooperate in both small and large groups, as well as in groups united by different principles; flexibility - the ability to cooperate in groups of people of different ages, belonging to different cultures and having different levels of education, having a different worldview and different interests, communicating in different languages; remoteness - the ability to cooperate in conditions of remoteness in space and time; technical mobility - possession of technical means of communication and readiness to master new means of communication;
- the levels of development of the ability to cooperate are proposed and described in detail: zero, low, medium and high;
- the communicative game is considered as a system that includes 14 elements: game means, game time and space, rhythm of the game, game entourage, legend, technical equipment, game and non-game result, game and non-game process, players and game equipment, interest. 5 elements from the listed: players, game equipment, non-game result and non-game process, interest, are connecting the game system with other systems. The suprasystem for a communicative educational game is the educational process. The structural connections between these 14 elements are determined by the rules of the game, which in turn can be constructed and analyzed using the method of "layering the game" based on a system-morphological approach. In a communicative educational game, there are 8 basic layers: the structure of interaction between participants within a team; the structure of interaction between teams; making game decisions by participants; managing the game process; a source of uncertainty in the game; access of participants to game information; game coalitions; game communication. In each of the layers, variants of the development of game events are highlighted. Thus, a matrix of changes in the parameters of a communicative educational game has been compiled;

- the analysis of approaches to the construction of games in the history of education and pedagogy based on the allocation of game elements and the types of relationships between them was carried out and the most effective for the development of communicative educational games aimed at developing the ability to cooperate was determined. As a result of the analysis of theoretical and practical material related to the use of games in education,
- 6 approaches are identified and described: subject-environment, imitation, improvisational, fantasy, event-based, gamification; the most effective approaches for constructing communicative games are theoretically justified: event-based and gamification;
- the effectiveness of the gamification approach as the most promising approach for designing games aimed at developing the ability to cooperate in modern society is substantiated;
- the meanings of the terms "gamification" and "gamification approach" have been clarified for pedagogy. The gamification approach is an approach to the construction of an educational game in which the game is created as an add-on to the basic non-gaming process. The main element of the game in the design is a non-game process, as which a communicative process can be chosen. The term "gamification" is used in two senses: gamification is the process of creating a game within the gamification approach, and gamification is the result of using a gamification approach, that is, a game designed within the gamification approach. In the title of this dissertation research, gamification is used in the sense of the result of the application of the gamification approach;
- a series of game educational programs has been developed to develop the ability to cooperate in the educational process within the framework of extracurricular activities based on the gamification approach (that is, gamification has been developed);
- the effectiveness of these programs has been experimentally verified. Experimental substantiation of the effectiveness of the developed programs was carried out in a series of experiments: one-year, two-year and four-year.

Thus, the effectiveness of game educational programs developed on the basis of the gamification approach in the development of the ability to cooperate among adolescents has been proved, which means that gamification is a means of developing the ability to cooperate among students in extracurricular activities in middle school. The results of the conducted theoretical research and experimental work allowed us to conclude that the initial hypothesis has been proved, the research tasks have been solved, and the research goal has been achieved.

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List of illustrative material

Appendix 1

Algorithm for constructing a group communicative educational game based on the layered structure of the game

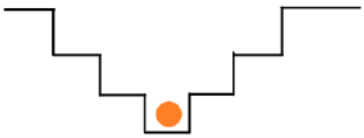
The technique is applicable both to create a new game based on an already known one, and to create a game from scratch. Let's present a methodology for creating a game based on a well-known one. Let's apply the resulting matrix (see Table 1 of this study) for the analysis and transformation of the game "Scythian Ladder". The authorship of the game is difficult to establish, since it is transmitted in the gaming environment "by word of mouth", a number of small desktop and computer games applications have been created based on its motives. For example, http://logic-games.spb.ru/skiff/.

The main goal of the game is to develop strategic thinking.

The rules of the game that we will transform using the algorithm.

The game involves two teams. Each team has 50 points at the beginning of the game. At the start, the ball is on the lowest rung of the ladder (см. рисунок).

Every minute the teams simultaneously make a move, making a note on a piece of paper and laying the sheet on the central table with the record down.



You can write a number from 1 to 9 on a sheet. At the signal of the presenter, the sheets are turned over.

Options for the development of events in each turn:

1. if the numbers of the teams are equal, then the ball remains in place;

2. if one of the teams has a higher number, the ball jumps one step towards the team with a higher number. There can be a jump either up or down - the direction is important.

All the action and all the moves are reflected on the screen, board or sheet, which is visible to everyone. After each move, the number recorded by the team is subtracted from its balance. The team cannot go beyond its balance.

The game ends when:

1. Two teams have zero balance. In this case, the team to which the ball is closest wins.

If one team has already reached zero, then the second team can make a move(s) by moving the ball in its direction.

2. The ball reached the top step from one side. The team on whose side the ball jumped to the top step wins.

If at the end of the game the ball is on the lowest step, as at the start of the game, a "Draw" is declared.

The morphological analysis of the game according to the proposed matrix is presented in Table 1 of this Appendix 1. In each layer, the value corresponding to the rules of this game is highlighted in dark. This technique can be used in order to develop the game-technical competence of teachers, develop game-technical thinking and gain the skill of designing games. To do this, using the example of a game, analyzing it by layers and making up a matrix, it is necessary to design possible variants of game models, arbitrarily changing the parameter values. Let's demonstrate this with an

example. In the "game coalitions" layer, change the value of "competition" to the value of "temporary coalitions". We will leave all other values unchanged.

Let's imagine a variant of a prototype of a game with a modified parameter obtained at one of the author's game designing classes dedicated to the use of this method.

Brief rules of the game. The game involves 4 teams. There are 4 balls of different colors in the game: red, blue, green or yellow, which are placed on a 4*4 playing field. At the start, each team receives a plan for the location of code cells and combinations, for placing balls in which they receive a given number of points. All information is open to the teams. The number of moves in the game is limited. The task of the teams is to score the highest number of points. For each turn, points are voted for the team, the team with the most votes (you can vote for yourself) can move each ball one square. Moves are regulated by time, teams can negotiate between moves. Of course, this prototype needs to be improved in order to become a full-fledged model of the game.

Using this algorithm to design a game to solve pedagogical problems, the order of actions of a game technician teacher is as follows:

Step 1. The leading task or goal of the game is determined.

Step 2. Each parameter (layer) of the game is analyzed, parameter values are determined that help as much as possible in solving the task.

Step 3. A prototype of the game is constructed (short rules reflecting the essence of the game) based on the values of the parameters (layers).

Step 4. The game model is being finalized based on the prototype.

Note that it is easier for novice game designers to build on existing game models, transforming and modifying them to solve certain tasks. Let's consider the process of transformation of the game "Scythian Ladder" for solving specific pedagogical tasks.

Step 1. Define the leading task: for example, the development of attention. Often a teacher solves a whole set of pre-set tasks with the help of a game, for demonstration we will limit ourselves to one.

Step 2. Consider the first layer "The structure of interaction of participants within the team". By changing the value in this layer to "Roles are assigned or a zone of rights and responsibilities is assigned to each team member", we will achieve a much greater effect in the development of attention, since each participant will be maximally involved during the game. Let's omit the consideration of the other layers of the game.

Step 3. Here are the obtained brief rules of a possible game with a modified parameter.

The game involves 4 teams of three to five people. The game takes place on a 5*5 cell field. Each move is putting each team in turn their balls on the field. The game involves from 12 to 20 balls of four colors, the players of the same team have balls of the same color. In the team, each player has his own ball, which only he has the right to put on the playing field. Each player has his own combination of balls, for which he receives points and puts them into the team's piggy bank. He has no right to show the card with this combination to anyone, but he can tell about it. Throughout the game, each player has the right to negotiate with his teammates about the position of the balls. The winner of the game is the team with the maximum number of points. These rules are a prototype of the game that can be deployed into a full-fledged game.

The proposed method of designing and modifying the collective game does not deny the creative approach, but promotes its development, giving a basis and a starting point for practical teachers. After developing a game model, it's time to create a game legend, prepare props and entourage - you can't do without creativity here. By laying out figures on the field, you can sow a meadow with flowers, and fight space aliens, and build bridges over raging rivers – everything depends on the creativity and actual tasks of the game technician teacher.

Based on this methodology, we construct games within the framework of the event approach.

Appendix 1. Table 1

Morphological analysis of the game "Scythian Ladder"

Game layer (parameter)	**Options for the development of events in the layer (parameter values)**					
Structure of interaction of participants within the team	1. The team acts as one unit, the interaction within the team is not regulated by the rules of the game. In the extreme case, one person plays in the team.	2. Only one leading role (commander/captain/voice) is defined in the team.	3. Roles are assigned or a zone of rights and responsibilities is assigned to each team member.	4.Microgroups with distributed areas of responsibility are formed within the team.	5. One or more special roles with their own area of responsibility are allocated.	6. There is no direct interaction in the team during the game.
Structure of interaction between teams	1. Without team interaction. The game is a competition without interaction between teams.	2. Indirect interaction.	3. Continuous interaction of all teams. Each step of one team affects the game situation and assumes a reciprocal step of the other (their) teams.	4. The interaction of the teams takes place only according to the specified scheme.		

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Game decision-making by participants	*1. discrete game (tight intervals of game decision-making)*	2. continuous play	3. combined game			
Game management and management	1. the consequences of decisions are determined by the organizer or a group of experts	*2. the consequences are determined only by the game model*	3. the consequences are determined by the game model together with the organizer of the game	4. the consequences are determined by the participants of the game		
The source of uncertainty in the me	1. combinatorial game	2. gambling or casual game	*3. strategy*			

Participants' access to game information	*1. open game*	2. dynamic game				
Gaming Coalitions	*1. competition*	2. temporary coalitions	3. permanent coalitions	4. cooperation		
The way of game communication	*There is no any verbal communication between the rivals*					

Appendix 2

List of international children's and youth gatherings "Empire of Friendship"

1. July 1, 2006, "Children's Symphony", Anapa, Russia;
2. November 2006, "Empire of Friendship", Novopolotsk, Vitebsk region, Republic of Belarus;
3. January 2007, "Empire of Friendship: Vivat, St. Petersburg!", Russian Federation;
4. March 2007, "Empire of Friendship: Spring in the Pushkin Mountains", Pushkin Mountains, Pskov region, Russian Federation;
5. June-July 2007, "Empire of Friendship: Sunny Astana", Astana, Republic of Kazakhstan;
6. July 2007, "Children's Symphony", Vitebsk region, Republic of Belarus;
7. November 2007, "Empire of Friendship: Karelian Fairy Tale", Pitkyaranta, Republic of Karelia, Russian Federation;
8. January 2008, "Empire of Friendship: St. Petersburg – Dreams come true";
9. March 2008, "Empire of Friendship: Pskov Guardians of the Russian Land", Krasnogorodsk, Pskov region, Russian Federation;
10. June-July 2008, "Empire of Friendship: Wisdom of the East – Almaty", Almaty, Republic of Kazakhstan;
11. July 2008, "Children's Symphony", Penza region, Russian Federation;
12. November 2008, "Empire of Friendship: Vitebsk – Defender of White Russia", Vitebsk, Republic of Belarus;
13. July 2009, "Empire of Friendship: Pechora – border, fortress and soul", Pechora, Pskov region, Russian Federation;
14. November 2009, "Empire of Friendship: Vitebsk experiments", Vitebsk, Republic of Belarus;
15. January 2010, "Empire of Friendship: St. Petersburg – the capital of naval glory", Russian Federation;
16. March 2010, "Empire of Friendship: Journey to the center of Europe", Novopolotsk – Polotsk, Vitebsk region, Republic of Belarus;
17. July 2010, "Empire of Friendship: Astana –HiTech Fairy Tale", Astana, RK;
18. November 2010, "Empire of Friendship: Pskov Battles", Pskov, Russia;
19. July 2011, "Empire of Friendship: Mission feasible", Karaganda, Republic of Kazakhstan;
20. November 2011, "Empire of Friendship: Festival of Creative Ideas", Lettsy village, Vitebsk region, Republic of Belarus;
21. July 2012, "Empire of Friendship: Let's Create Fantasy Cities in Eurasia", Petropavlovsk, Republic of Kazakhstan4
22. November 2013, "Empire of Friendship: In the Labyrinths of Intelligence", St. Petersburg, Russia;
23. November 2014, "Empire of Friendship: Urban Strategies", Novopolotsk, Vitebsk region, Republic of Belarus;
24. November 2015, "Empire of Friendship: Pskov – key-city", Pskov, Russia.

Appendix 3

Information about online meetings and online tournaments						
	Title	Dates of the event	The number of participants / teams who started participating in the online meeting without taking into account the curators of the groups	Number of participants/teams who reached the end of the online rally	Age of participants	Geography of participants
1	Online meeting Unbelievable, but a fact or a New Year's adventure"	January 4-6, 2011 г.	42people/12 teams	30 people/9 teams	12-15 years old	Astana, St. Petersburg,Vitebs, Novopolotsk
2	Online meeting "New Year's adventures on Multiworld"	January 4-6, 2012 г.	23 people/7 teams	23 people/7 teams	12-16 years old	Astana, Pechory (Pskov region), St. Petersburg, Novopolotsk, Vitebsk
3	Online tournament "Chocolate Boom"	March 29th, 2012 г.	27 people/9 teams	9 people/3 teams	11-15 years old	Saint-Petersburg, Astana,Vitebsk
4	Online tournament "Is there life on...?"	March 8th, 2011 г.	29 people/9 teams	22 people/6 teams	11-15 years old	Saint-Petersburg, Astana,Vitebsk
5	Online tournament "Full Fashion"	May 27th, 2012 г.	20 people/5 teams	16 people/4 teams	13-16 years old	Saint-Petersburg, Astana,Vitebsk

Appendix 4

Methodological recommendations for the organization and management of the extracurricular annual game program "My Bright World"

This material is published in the article: Oleinik Yu.P. Methodological recommendations for the organization and management of the extracurricular annual game program "My Bright World"//Education at school: a variety of methods and forms: a scientific and methodological guide/ Under the total. scientific ed. by V. I. Gerasimov.ed. by E.N. Baryshnikov-St. Petersburg: Publishing House of VTsIOM-inform-press, 2015., pp. 36-55

1. Structure and features of the program

Below is a detailed description of the content of the program implemented in the 2013-2014 academic year, as well as the methodology of its organization and management.

The key idea of the program "My Bright World" is to create an educational space in which the formation of the class as a collective takes place, based on cooperation and mutual responsibility, creating conditions for the development of the ability to cooperate. Recommended age of participants is 5-6 grade.

A characteristic feature of the program is a special way of creating shift teams, which allows achieving the goal of forming a children's team of a high level of organization. The action of the program takes place in the form of seven game stages interconnected by the legend, at each stage the class teams confirm the presence of certain character qualities. The game stages are implemented by the class teacher in accordance with methodological and game engineering developments by holding game meetings with the class on the school grounds, as well as performing intermediate team tasks. At each stage, the relations of intellectual cooperation are constructed in the projected game situations.

During the program, the students of the class and their homeroom teacher are immersed in a role-playing game in which the homeroom teacher is assigned the status of a Master. Game communication and reflection of the status growth of players is real and virtual. Really: this is face-to-face communication + a competition screen that is printed out and posted in the classroom or in another place that participants can see every day. Virtually, the movement within the game of each player is reflected in the group on the Vkontakte social network and on the website of the Winged Unicorn Foundation. In each academic week, 2 academic hours are allocated for conducting the program.

During the program, participants go through 7 stages, each of them is associated with one of the colors of the rainbow and with two personal qualities of a person. The success of passing each stage is recorded by the teacher by virtual and physical presentation of chips of various colors of the rainbow: red, orange, yellow, green, blue and purple. The chips have a different shape, which is reflected in the form of the competition Screen at the start of the program. The stages of the program "My Bright World" are characterized by:

- the presence of intermediate tasks (from one to three), which take place in various forms and are inscribed in the educational program of the class and the educational system of the school. Intermediate tasks are effectively carried out at all stages except the first and final;
- game tests that allow participants to prove that they have certain qualities of character. The main part of the game tests are intellectual cooperation games developed or modified by teachers of the Winged Unicorn Foundation;
- building new relationships of mutual assistance in the team.

At each stage, participants find themselves in new teams, that is, in new conditions for building cooperation. The teams are formed by the teacher, the order of formation depends on the

specific relationships in the classroom and are determined for each class group separately. At the beginning of each stage, a commander, a name and a motto are chosen in the team. The commander is the link between the Master (class teacher) and the team members, performing representative functions, as well as the team organizer, determining the means and forms of achieving the goal, and also helps to establish cooperation in the team, regulating the relationships of the participants.

2. The content of the program and methodological recommendations for its organization and management

2.1 The first stage of the program "My Bright World". Game test "Creative Agency"

The first stage for the guys is motivational, it begins without intermediate tasks immediately with the game test "Creative Agency".

The goal of the game:

- development of creative imaginative thinking,
- development of the skill of effective team interaction,
- development of a positive atmosphere of cooperation in the classroom.

Below are the procedures for organizing and conducting the Creative Agency game test.

Procedure 1. Preparation for the game of the class team

It is necessary on the eve or a few days before the game to divide the entire class team into an even number of teams of 3-4 people each. At the first stage, the most appropriate way is to divide into teams, which allows you to unite friends within a team. Each team chooses its own commander, name and motto – this is a small but important organizational action of the guys united by one team. At the beginning of the school year, this action often requires the help of a teacher.

Procedure 2. Preparation of premises and props for the game

Before the game starts, you must:

• arrange the tables according to the number of teams, place a plate with a number on each table. Even tables are located closer to the host's table than odd ones. Each team will sit at a separate table. Even-numbered teams play an "ACTIVE" role, odd-numbered teams play a "CREATIVE" role;

- install a presenter's desk with a sign CIASMC - Creative Ideas and Solutions Management Center;
- print and number drawings with doodles, for 6 teams, 30-40 drawings are needed for the game;
- prepare one blank A4 sheet for Creative teams;
- split tasks for active teams. The number of sets is equal to the number of honest teams. The list of buildings is given in Appendix 2;

Procedure 3. Organization of the course of the game "Creative Bureau"

Each game challenge begins with a greeting and introduction of the teams. This tradition is important and interesting to the guys, helps them express themselves, and gives some guys quite difficult game tests ease and additional interest. The teacher should pay attention, starting from the first game, so that the names and mottos of the teams are original and are within the framework of culture. All kinds of conflicts in the team about the name and the choice of the commander at this moment are finally over, since the presentation of their team by the choir means full acceptance and agreement with the group decision.

The first round of the game "Creative Agency".

At the beginning of the game, a teammate draw takes place: the commanders of odd teams draw even numbers, determining a teammate for this round.

A representative of each Asset team takes the first task from the moderator, returns to his team, the team performs it and presents it to the moderator for evaluation. The moderator evaluates the completed task on a two-point scale: "Good!" = 1 doodle, "Great!" = 2 doodles. During the evaluation, the presenter immediately randomly gives drawings with droodles to the Asset team,

the Asset team passes it to its Creative Team in accordance with the draw. The first round lasts 20 minutes. The number of completed tasks by the Asset team depends only on the speed of execution. Appendix 4 provides examples of such tasks.

At the same time, the creative teams are working with the doodle drawings, coming up with as many interpretations as possible. At the start of the game, each team is given 2 drudle drawings, with which teams can immediately start working, inventing and recording strains. Further drawings-doodles are transmitted to them by the corresponding Asset-team.

After the first round, all the drudle drawings are returned to the host, the Creative teams also hand over lists of their strains (interpretations).

The second round of the game "Creative Agency"

At the beginning of the second round, the teacher suggests that the teams switch places: all Creative teams become Active teams and vice versa. Specific numbers and, accordingly, team tables among the teams are distributed by drawing lots. The teammate draw is conducted in the same way as at the beginning of the game.

Procedure 4. Summing up

The teacher needs to discuss with the teams the results of two types:

• game results, namely, what achievements the teams have, which teams are the most successful;

• over-game results and discussion of the processes that took place in the game: interaction within and between teams, optimal strategy in the game, impressions.

The teacher can announce the game results the next day by calculating the number of strains invented by each team. The teacher determines the passing score, that is, the number of strain-interpolations required to obtain the first red token in the competition screen. It is important that the maximum number of participants, and it is better that all participants "earn" their first token in the first game. We are not discussing the passing score itself here, since it can be completely different in each class.

Noting the game results, it is interesting to post the droodles with invented strains in the office so that everyone can read, highlighting the most creative ones.

Key questions for post-game discussion in a circle (it is convenient to ask by teams):

• Which round is more difficult Asset or Creative?

• Were the responsibilities distributed within the team?

• Is it interesting to earn doodles for another team, knowing that it is your creative competitor?

• There was no ban on the exchange of ideas in the game, did the teams try to exchange strains or organize a collective discussion of droodles between Creative teams? Why? Did it work out?

• How was it possible to come up with the maximum number of interpretations? Are there any techniques of creative thinking known to the guys?

• What ways of training creativity and developing creativity are still known to the guys?

• In which professions are creative abilities necessary?

When conducting a discussion in a circle, the teacher should keep in mind the leading line of the entire program – teaching constructive cooperation in a team, it is from this point of view that additional questions can be asked in the post-game discussion.

2.2 The second stage of the program. Game test "New island"

At the beginning of the second stage, as well as at the beginning of each next one, it is necessary to divide the class team into teams. It is advisable to do this two or three days after the completion of the previous stage. Determining the composition of the team in one way or another, it is necessary to remember about the guys who are absent for some reason. Each stage lasts about a month and illness or other reasons for short-term absence should not be the reason for "dropping out" of the program. The number and composition of teams also depends on the final game test. At this stage, this is the game "New island", an important point for its implementation is the quantitative

composition of the team – 4-5 people. The election of the commander, the name and the composition of the motto takes place before the first intermediate task. This composition of teams is preserved throughout the stage, it is with this composition and with this name that the guys participate in the stage game test.

For the game test "New island", as well as for all subsequent ones, teams receive "admission" from the class teacher based on the results of intermediate tasks. The number of tasks at each stage varies from one to three and depends on the total workload of the class in a particular period. On average, the team is given one week to complete each task. The content of team intermediate tasks directly comes from the annual calendar of active classroom activities, the general educational program of the class and the school. Thus, the program itself also serves as a motivational tool for participation in school and classroom activities. Note that the more teams will be admitted to the game test, the stronger will be the motivation to perform intermediate tasks at the next stage.

The game test "Novaya Zemlya" is a modification of the communication game "Digicon". The modification was made not only from the point of view of the legend, roles and entourage, but the pedagogical basis of the game was completely changed.

The goal of the game "New island":

• development of the ability to plan your actions,
• developing the skill of constructive interaction in a team,
• promoting the formation of a positive atmosphere of cooperation in the classroom,
• development of communication skills.

Procedure 1. Preparation for the game test

It is necessary to prepare the following props: chairs, ropes, forms for dictionaries by the number of commands, two cardboard keys of different shapes, cardboard locks by the number of commands with two keyholes.

Before the game, each team chooses one person from its composition "for a responsible role." The role of the participants is not immediately announced, in the future the selected guys will play the role of local natives. These people can also be chosen by a teacher. It is important that these guys are able to clearly follow the rules of the game.

A place fenced off with rope or chairs is determined for each team. Teams are invited to move to their team location. It is better that the guys can sit during the game. Team seats are distributed evenly around the perimeter of the room. The selected natives sit or stand next to the presenter during the briefing.

Procedure 2. Instructing the group, presenting the legend of the game

The teacher tells the legend of the game, simultaneously giving detailed instructions on the rules of the game.

Game legend, instruction: "You flew by plane. Suddenly, for unknown reasons, the plane lost control and crashed. All the passengers, that is, you, remained alive. You are scattered in different parts of a small island. It turned out that the island is inhabited. There are people living on it, they look very similar to you. But this is only externally. We will call these people Aborigines (at this point, the presenter points to the selected people).

Features of the aborigine:

1. very kind, do not wish evil to anyone, are not aggressive. When another aborigine reaches out to meet them, they immediately give him what is in their hands,
2. short memory, remember no more than 10 words at the same time,
3. responsive, fulfill any simple monosyllabic requests in their language.

The Aborigines are very careful. When they saw the people scattered on the island, on the orders of their leader, they gathered these people and, just in case, imprisoned everyone in cells. There are only 4 cameras (the number according to the number of teams). It is not known why you were assigned this way. Maybe, according to the aborigines, you are similar or you were found near one hill. Yes, the aborigines are kind, they do not offend you, they feed you, but they do not let you out of the cells. They watch over you day and night, leaving only for meals. It's been a

long time, but you're still in the cell. It is not known how long you will be in them and what the plans of the leader are. It's time to get out! All the cells are locked. The leader himself comes and closes the cameras. He leaves the key here, not far from the cameras, but you can't get it yourself. You can try to ask the aborigines to get the key, because they are very responsive and fulfill any requests in a language they understand.

Now you will have 7 minutes of time, you need to come up with 10 words in a new non-existent language. 10 words-commands that will help you get the key. With the help of the words you have invented, you will address your Aboriginal guard."

Procedure 3. Compilation of a native dictionary

Each team with its native makes its own dictionary of ten words in two copies. It is necessary to allocate 5-10 minutes for this. Please note guys that requests-commands must be monosyllabic and, for example, a command meaning "forward" means only one step forward. The dictionary can contain nouns, verbs, and other necessary parts of speech. It is also necessary to say that the aborigines do not understand that the prisoners want to get the key, that is, they can just stand next to the key without picking it up until the appropriate command follows. The Aborigines will not open the lock until the "open" command follows. Therefore, the guys should pay attention to the choice of words. It is also worth warning that there may be obstacles on the way of the aborigines: ropes stretched at different heights, chairs and others, but do not show which ones. In an invented language, you cannot use existing languages: English, Spanish, words on the contrary, words without vowels, etc. – only your own invented words. Recommendation to the presenter: be sure to check the compiled dictionaries for the absence of aggression, ridiculous commands and the "readability" of what is written.

At the end of the allotted time, the aborigines with one copy of the dictionary approach the presenter. The teams remain in their cells, each team at this moment has a second copy of the dictionary they have compiled. The presenter imagines that he is the leader of a good tribe and will now hide the key. The leader-presenter asks the aborigine to go out into the corridor "for a meal." At this time, the key is placed in front of the teams in some easily accessible, but not immediately visible place. For example, under a book on a table or on a shelf in a desk, in a box in the center of the room. Obstacles are installed, ropes are stretched at different heights.

Teams are given 2-3 minutes to build a strategy and think through the sequence of voice commands.

Procedure 4. Introduction of an additional rule. Start of the game

The leader-leader goes out the door and tells the aborigines that there is another feature in their tribe: during the meal, the aborigines exchange memory, that is, compiled dictionaries. It is better to do the exchange in a circle. From now on, the Aborigines respond only to commands in their new vocabulary. You can't do anything else, just what they ask. Remind the aborigines that they are kind, but stupid. They do not know and do not understand that prisoners need a key, but they fulfill all their requests.

The presenter with the aborigines enters the hall with cameras. It's great to add a "native" entourage and make the Aboriginal entrance theatrical to the music in a ritual dance. The chief places the aborigines in complete silence so that they are about the same distance from the key. Tells the teams about the tradition of the tribe during the meal to exchange memories and announces the start of the game. Focuses on the goal of the game for the teams: "Get free". If there are additional questions, it can be explained that the priority goal is one's own liberation, and then the liberation of all others. This is worth talking about only if there is a misunderstanding.

Procedure 5. The course of the active part of the game

Each beat of the game lasts 3-7 minutes, the time is determined at the discretion of the host, depending on the passion for the game by the teams and the development of game events. It is better to make the first beat shorter. At the end of each bar, an Aboriginal meal is announced. The leader takes them out into the corridor and performs the procedure of exchanging dictionaries. While the aborigines are studying their new vocabulary, the leader-leader returns to the hall with

cameras, "closes" the cameras, if some have managed to open, but not all, hides the key in a new place, invites the aborigines to enter the hall in a ritual dance. He arranges them anew, reminding the prisoners that another memory exchange took place during the meal. Announces the start of the next beat of the game.
Recommend that participants shout requests in an incomprehensible language in a chorus so that the aborigine can hear them. It is necessary to carefully monitor the fact that the aborigines do only what the teams ask them to do. It is optimal to conduct two or three cycles. If the teams failed in two cycles, then in the third round place the key in a more accessible visible place and increase the duration of the cycle.

Procedure 6. Ending the game

The game ends when all the teams have been released, that is, all the teams have left the cells.

Important:

- the lock on the camera can only be opened from the outside;
- an aborigine gives the key only to another aborigine, he does not give the key to prisoners;
- to help come to the idea that it is necessary to free everyone, it is possible to introduce a second key. The scenario in this case is as follows: one camera was opened, the players do not leave this camera and sit inside happily, discussing how they were the first to be released; or the players left the camera and exult in their victory, not thinking about the rescue of others. In this case, the presenter announces that the leader felt "something was wrong" and made an early bypass of the cameras. He saw that one camera was open and strengthened the locks. Locks with two keyholes. He also closed each lock with a second key, the leader hides each key in its place. In this case, to get out of the cells, you need to open each lock with your own key.

Procedure 7. Summing up

Game summary. At the end of the second stage, all the released team members, as well as the guys who played the role of aborigines, receive orange tokens, that is, the homeroom teacher paints the necessary figures in the second column in orange on the competition screen.
Over-game summing up. During the post-game discussion in the general circle, it is important to discuss the following issues, giving the floor to each team and each "aborigine":

- What was the hardest part of the game for you?
- Was the dictionary compiled enough? What command words would you add if you had the opportunity to play again?
- Have different teams tried to agree among themselves? How was it expressed? Was the agreement successful? What prevented or helped the arrangements?
- What qualities does this game develop?
- If you were to play this game again, what strategy would you choose?

During the discussion, it is important for the moderator to note that teams achieve much faster results when they agree among themselves. It is possible to agree on the order of opening the doors, that the shouting of commands occurs sequentially, and not simultaneously. Please note to the teams that there was no competition in the game task, the goal of "getting free" implies joining forces.

2.3 **The third stage of the program "My Bright World". Game battle "RitmoGrad"**

At this and subsequent stages, the order of execution of team intermediate tasks is the same as at the second stage. The optimal number of people in the team at this stage is 5. If the number of players is not a multiple of five, it is better that some teams have less than five people. With enough time to spend a team warm-up. Team warm-up can also become one of the intermediate tasks of this stage. The warm-up rules are given in the appendix.
Game warm-up before the game "RitmoGrad"
Time: 20 minutes.

The purpose of the game warm-up:

• concentration of attention of each team member,
• demonstration of the importance of each participant's contribution to the overall team result,
• development of the information exchange process,
• preparation and attitude of the team members before the big game.

Rules of the game warm-up

During the entire warm-up, participants are allowed only a verbal way of exchanging information, it is forbidden to write down and sketch anything except the answer on the form after the signal of the presenter. In accordance with the course of the program "My Bright World, the classroom team is divided at this stage into teams of 4-5 people. Warm-up is also carried out in teams. Teams are offered a riddle:"The international scientific laboratory "Rhythms of Life" conducts various studies on human biorhythms. In one of the experiments, people of different professions were offered to live for six months in a specially created unusual city. In this city, day and night, seasons were artificially changed, life proceeded according to its own calendar, which did not coincide with the usual one. People living in the city could try themselves in a new capacity. Everyone was given the right to change their profession at will. They performed their professional duties according to the detailed instructions issued to them. This unusual artificial city was called Ritmograd".

3Then each team member is given two or four cards with facts related to life in the Rhythm Fence. Cards cannot be exchanged, read aloud, or shown to each other. Within one minute, the task of each player is to remember the facts that he got.

After 1 minute, the participants hand over the cards. For all teams, the teacher voices 1 task.

Your task is to compare all the facts, and, having built a chain of logical conclusions, answer the question: "How many people have tried themselves as deputies of the city parliament of Ritmograd during the entire experiment?"

No more than 10 minutes are given to complete the task, and nothing can be recorded or sketched during the task. After the end of the time, the moderator invites each team to write down a number on the form, which in their opinion is the answer. Then the correct answer and the possible course of the decision are announced. The facts offered to the team members, as well as a possible variant of reasoning in the team to get an answer, are given in one of the author's articles [2]. Each team is given a total of 15 facts.

Game battle "RitmoGrad"

The goal of the game:

- creating conditions for the formation of skills and the need for cooperation,
- formation of each player's own active position,
- formation of the ability of effective interaction,
- development of logical thinking,
- development of oral information handling skills.

Procedure 1. Preparation for the game

It is necessary to post or draw an empty calendar on the board. Print cards with information and tasks.

For the convenience of the presenter, the cards are numbered. The minimum number of cards required to achieve the game goal is 20 (the first 20 cards). The remaining cards are added 5 at a time if there are more than 20 players. For example, if the players are from 21 to 25, then the first 25 cards participate in the game, and the players are divided into 5 teams. If the players are from 26 to 30, then 30 cards are involved in the game, divided into 6 teams. Team tasks are also numbered. They must also be used in the numbering order: for 20 people – the first 4 tasks, for 21-25 people – the first five tasks, for 26 or more – all six tasks.

Procedure 2. Introduction to the rules and legend of the game

Legend: "The international scientific laboratory "Rhythms of Life" conducts various studies on human biorhythms. In one of the experiments, people of different professions were offered to live for six months in a specially created unusual city. In this city, day and night, seasons were artificially changed, life proceeded according to its own calendar, which did not coincide with the

usual one. People living in the city could try themselves in a new capacity. Everyone was given the right to change their profession at will. They performed their professional duties according to the detailed instructions issued to them. This unusual artificial city was called RitmoGrad. This experiment was conducted quite a long time ago, and some information, unfortunately, has been lost. In particular, fragmentary information remained about the annual calendar of the Rhythm Fence. Will you be able to restore the residents' calendar based on this information?"

The goal of all players (class team): make a full annual calendar of the city's residents by entering the names of all five seasons and all ten months of the year in the correct sequence. In the calendar, time goes clockwise.

Additionally, each team draws a card with its individual information task. In accordance with the task, each team needs to have 5 cards with the specified information on hand by the end of the game.

Each participant is provided with one information card. The text of this card cannot be shown to anyone, but you can tell and read out the information specified in it. Remark. If there are less than five people in the team, then someone will get two cards, the main thing is that each team has five cards in total.

Rules for filling out the calendar and using cards:

1. You can exchange cards. This is what will help you gather the information you need inside the team. You can exchange cards according to the one-on-one rule. That is, at any given time, a player can only have the starting number of cards in his hands. You cannot give your cards to the commander or put them anywhere.
2. You cannot read the text of someone else's card until you have exchanged it.
3. You can approach the general annual calendar and write something in it only at the signal of the presenter. This happens once every three minutes.
4. Every three minutes for exactly 30 seconds, the presenter announces the form of the general calendar available for entries. One person can write only one word in a shared calendar. Writing object: chalk, pen or marker, allowed to use – only one.
5. During the whole game, nothing can be written anywhere (except for the names of months and seasons in the main calendar form). Only the presenter has a writing subject, and he gives it out during the availability of the calendar to anyone.
6. If there are several applicants for a writing subject at the same time, and they cannot agree among themselves who will be the first, the presenter does not give out the writing subject to anyone.
7. The teams that by the end of the game have collected 5 cards necessary to complete their team task, provided that the entire annual calendar of Rhythmograd is filled in correctly, win.

Procedure 3. The course of the game "RitmoGrad"

The moderator distributes 5 cards to each team and gives a minute to familiarize each participant with his information and an oral exchange of information by teammates. Then each team pulls out a card with a team task. Another 1 minute is provided to find out how many necessary cards are already in the team and how many need to be "extracted".

The presenter reminds that in addition to the team task, there is a common task for everyone – "drawing up the annual calendar of Rhythmograd". After that, he announces 5 minutes to develop a general class strategy. At this point, players cannot read aloud the text of their cards, but can only offer a plan of action.

The moderator announces the start of the active part of the game. From now on, players can freely move around the cabinet, exchanging information and cards. During the game, the presenter clearly monitors the time, announcing the availability of the calendar for entries every three minutes for 30 seconds. Duration of the game: 20-40 minutes. If the players are not sufficiently prepared (if the players are poorly organized within the team), you can also announce 2 minutes for a meeting within the teams 10 minutes after the start of the game, having previously described what is happening, which columns of the calendar are filled in and which are not.

The moderator announces the end of the game based on the intensity of the processes occurring during the game and the interest of the players. If in the course of the game it is clear that there are literally a couple of minutes left before the full compilation, it is worth giving this time to the guys. If the game is very sluggish, then you need to help, suggest a possible course of action, remind the rules.

During the game, it is also necessary to monitor the implementation of the rules for exchanging cards. You can introduce a penalty system if necessary, taking it into account when summing up the game.

Procedure 4. Summing up the game

Game summary:

1. Each team first tells about their team task and the results of its achievement: whether they collected the five necessary cards, with whom they exchanged, what information was collected in their cards by the end of the game (read out).

2. The presenter reminds that even if the team has collected its five cards, the victory can be credited to them, if only the general annual calendar of the city is compiled. There is a discussion of the chronology of the filling process. What were the disputes, how were the conclusions drawn, who owned the most valuable information to fill out the calendar. The presenter should note that each participant had the information necessary to compile the calendar.

3. The presenter demonstrates the correct option, a comparison takes place.

If the calendar is filled in correctly, all teams that have completed their task will receive yellow tokens. The presenter paints the necessary shapes in yellow in the third column.

The third point should be carried out at the end of the post-game discussion.

Key questions for post-game discussion:

- Was there a common strategy for fulfilling a common collective task? Which one? Is it successful? Who suggested it? What other strategies could there be?
- What were the strategies for performing team tasks? What other options could the team have?
- What was the most difficult thing for everyone in this game?

It is important to ask each player what contribution he made to achieving the overall result, what else he could have done, why he did not.

2.4 The fourth stage of the program "My Bright World". Game battle "Crossing"

"Crossing" is a combination of several classic rallying games. Two teams take part in this game test, so at the intermediate stages it is advisable to divide the class into an even number of teams of 4-5 people each.

The goal of the game "Crossing":

- team building,
- removal of spatial barriers between participants,
- creating an atmosphere of mutual assistance,
- developing the ability to think about the whole team and follow a team strategy,
- development of such qualities as politeness, care and kindness.

Procedure 1. Preparation for the game

The following props are required for the game: 12 sheets of cardboard, scissors, 10 shawls / scarves, chalk / 2 ropes / paper tape – to mark the lines.

On the floor of the classroom or hall, one line is marked with chalk, paper tape or a stretched rope. The line goes from wall to wall and divides the office space into two unequal parts. The first part (narrow) is 2-3 wide steps wide, the second is everything else.

One of the participants is invited to take 6 ordinary steps from the line - this is how the width of the river is measured. At the level of the last step, another line is indicated. It is important that there is also a space 2-3 steps wide behind the second line. The teacher divides the team into 2 equal teams. Naturally, in the case of an odd number of participants, one of the teams will have one more player. Here you should pay attention to the even distribution of boys and girls in teams.

Teams are invited to take a place on the playing field as shown in the figure. It is convenient for the presenter to stand in the center of the field.

Procedure 2. Immersion in the legend and presentation of the rules of the game

The legend of the game: "Two cheerful non-hostile tribes of aborigines lived on different banks of a wide and mighty Rattling River. They saw each other only at a distance, since no one dared to swim across this swirling river, it was also very difficult to build a bridge. The waters of this river were very hot. In each tribe there was, of course, a leader – the wisest and most responsible member of the tribe."

At this point, the presenter suggests that the teams determine the wise leader of the tribe within two or three minutes, as well as come up with a name and a short battle cry of the tribe. Then the commands are presented.

Continuation of the legend: "Once the strongest hurricane mixed up the whole life of the tribes. He moved the tribes to opposite shores. Only when the hurricane calmed down, the aborigines were able to come together to see who was left alive. At that moment they realized that their houses were on the other side of the river. Of course, we need to move back home. How can this be done? It is impossible to swim through the hot, stormy waters of the Rattlesnake River.

The oldest members of the tribe remembered the legend of the magic stones. These stones could help to get to the other side if you step on them in a special way. Each tribe had exactly six such stones, they were passed down from generation to generation."

Each leader is given 6 A4 cardboard boxes – they serve as magic stones for the players. The host of the game says that only he can freely walk on the waters of the river, since he is the Eye of the Rattlesnake River. Everyone else can only step on stones, otherwise they will get burned.

Stones have special properties:

1 Stone can be placed in any part of the river and the shore, you can take it out and move it through the water for short distances (15-20 cm).

2 A stone does not sink if at least some part of a person's body touches it. If a stone is placed on the water and at least for a second left it without a body part (not stepped on, not held by hand, etc.), it instantly sinks (= the presenter takes it away).

3 The stone can be returned if one of the members of the tribe loses any ability: sight (blindfolded), voice (forbid to speak), hands (tie them together), etc. This rule can be announced during the game, when there is a precedent for losing a stone.

4 Stones "love" the polite, so you can only contact within the tribe using polite words: "Please give me your hand!", "Be kind, pass the stone!", "Thank you for your help!", "Thank you!", etc. Otherwise, one of the stones may decrease in size.

Each time, in case of impolite treatment, the presenter cuts off (tears off) a strip from each stone about 3 cm wide.

The rule of the Rattling River: if any of the members of the tribe touched the "water" (for example, stepped over the cardboard with the edge of his foot or touched his hand), the whole tribe returns back to the shore to treat the "burn" of the victim, then the team begins its journey anew. You can cure the "burn" by blowing all together at the place of the burn.

It is important that the whole tribe needs to move to the other side, not just a few people.

The presenter needs to demonstrate how to put and move the cardboard for a minute without leaving it without swinging a part of the body. A participant can remove his foot from the cardboard only if there is another participant's foot on it.

Procedure 3. Starting and running the game

Each team is invited to think about ways to cross and train on the shore. Be sure to say that it is important for everyone to move. At the command of the presenter – he is also the "Watchful Eye of the Rattling River", the teams begin to move.

The teams are moving from opposite shores. It is important for the presenter to take a position so that both teams can be seen. It is good if the teacher has the opportunity to attract an attentive assistant (colleague, parent or even a high school student). The assistant must be instructed in

advance.

In this game, it is important to determine a flexible measure of the rigidity of the rules: at the beginning of the game (the first 10 minutes), it is very tough to follow the spades, returning the team back, and take the "stones" if they are left without touching. When the team has 4 cartons left, offer them to return the lost ones in exchange for the sight/voice of one of the aborigines (blindfold the player or make sure that he is silent). The eyes are blindfolded or a vow of silence is imposed only at the request of the person. If there are several people who want to limit their abilities for the duration of the game, then the decisive word belongs to the leader of the tribe.

After 10-15 minutes of the game, you can reduce the stiffness and not pay attention to small spades, but do not ignore gross violations. You should clearly monitor the implementation of the "politeness" rule throughout the game.

Methodological recommendations:

• When the team returns from a state when one or two people have already moved to the other shore, it is important to let them calm down and analyze the situation. Ask the question: "What was the mistake of the team (not a specific person, but the whole team)?", "Maybe it's worth changing the order of the aborigines or radically changing the strategy?"

• The presenter should prompt the guys, help them be attentive. Often remind you that you can not remove your foot while the other has not yet stepped. This becomes especially important when the player is a step away from the shore. At this moment, he stops thinking about the tribe and easily jumps to the shore, leaving the "stone" without touching. In this case, the stone is also taken away. This is usually followed by the next player's spade, as the distance for the jump increases, and the whole team returns back.

• If one of the teams gets ahead of the other, you can let them make a mistake and come back several times.

• Tell me that it is impossible to start moving from the shore all the time to the same player, because some, having stood on the shore and never tried to "walk on stones", may fall off them at the last moment. In the end, it is better to go to the most attentive and responsible.

• Tell me that it is impossible for a person deprived of abilities (vision, voice) to go to the rear, since it is most difficult for him.

• The duration of the active part of the game is 25 - 35 minutes.

• Often, around the middle of the game, teams begin to pay attention to each other and look for mistakes from each other. "The nega has a spade-a spade!" - you can hear from someone pointing to another team. Please note to the teams that the game is not competitive. The task of the tribe is to move to its shore, and not to do it faster than others. And it is also worth noting that the "Watchful Eye of the Rattling River" is the leader, and if the Eye blinked at the moment of the spade, then the team was lucky.

• You can pay less attention to the spades at the end of the game, but the game should require enough effort from the guys and seem difficult enough for them. The feeling that they have coped with a serious task together will help the team to unite.

• Advise the children to take off their shoes in order to "reduce the size of their feet", noting that aborigines usually move barefoot in this area.

• Optimal game result when both tribes returned to their shores. But if some team is far from getting across the river, after half an hour it is worth interrupting the game and starting its discussion.

Procedure 4. Summing up the game

Teams that have moved to their shore in full force receive the next green token.

In the post-game discussion in the circle, the following questions should be discussed:

• What strategy did each team choose? Did she change it during the game?

• Did the team help the other team with advice? Why yes, why not?

• Is it difficult to be polite? Is it nice to be polite to you?

• What other ways could there be to cross such a river?

• What prevented the team from moving the first time?

• Was the chosen leader really the wisest and most responsible Aboriginal of the tribe?

Also, each person in the circle should be given a say on the question: "What was the most difficult thing in the game for you?"

2.5 The fifth stage of the program "My Bright World". Game test "Glass Maze"

The game "Glass Maze" is a modification of the game "Corporate Wilds", also known as "Collective Maze", used in practical training in professional development programs [1, pp.60-67]. Two teams take part in this game test, so at the intermediate stages it is advisable to divide the class into an even number of teams of 4-5 people each.

The game is aimed at developing visual memory and skills:

• stay calm and follow the chosen path regardless of external interference;
• be attentive to all actions of teammates and rivals;
• build constructive interaction within the team;
• focus on a specific task.

Procedure 1. Preparation for the game

To play, you need to mark the playing field on the floor – this will be the floor of an imaginary glass maze. You can draw a 7*7 checkered field with chalk or make the same field on the floor with paper tape. The size of each cage should be large enough so that you can freely stand on the cage with two legs. Approximately 50cm*50cm. In some cells of the field, you can draw elementary drawings (or glue sheets with drawings): a house, a smiley face, a cloud, a pig, a Christmas tree, etc. These drawings in the course of the game act as landmarks for the participants of the game, but for the guys the purpose of the drawings remains a mystery until the end of the game. Without the use of drawings in the game, the emphasis on the development of visual memory becomes stronger. Exactly the same field must be drawn on a piece of paper for the presenter, it is possible without additional drawings, and to indicate any path on it (example in Appendix 9). To participate in the game, the entire participating team of guys must be divided into two teams. The teams stand opposite each other on both sides of the playing field, without stepping on it, it is convenient for the leader to stand on the side of the "exit" from the maze.

Procedure 2. Presentation of the legend and rules of the game

Legend of the game:

"Two teams have to pass a test today, which is called the "Glass Maze". This glass maze is in front of you. There are lines on the floor, which are the base of transparent walls that go high up into the sky. We don't see these walls. In this maze there is only one way to go from the entrance to the exit. The path is now known only to the presenter (it is drawn in advance on the printed playing field at the presenter). You have to find this path and follow this path as a whole team. The team that will be the first to complete the maze will win. The teams take turns. The path is sought intuitively or logically, but in any case it is the work and decision of the team.

What does the team do on its turn? One person from the team goes to the side of the maze where the ENTRANCE is located. Trying to guess where there is no wall, he takes a step on any cell.

- If the player has chosen the cell correctly (coincides with the path indicated by the presenter), then the presenter is silent, and the participant has the right to take the next step. Steps can be taken forward, backward, left, right, backward, but not diagonally. The steps can be done as long as there is no code signal "BEEP" from the host. - If a player stands on the wrong cell, that is, breaks the wall of the maze, then the presenter loudly says "BEEP". The "BEEP" signal means that the player has made a mistake and he needs to go back. You can return only without breaking the walls. (Breaking the wall on the way back brings a penalty point to the team, the presenter immediately talks about it and notes to himself). After returning, the player stands up to his team (at the end of the queue). And the move goes to another team. The glass walls are restored immediately."

Additional rules:

- Teammates can help the player with words, telling where to go on the playing field: "Right!",

"Left!", "Back!", etc.

- Rivals are not forbidden to interfere, that is, for example, to say loudly "To the left!" when in fact it is necessary to go back or to the right.

Procedure 3. The course of the game

Team representatives (commanders) play the first move. You can do this with the help of the classic game "Rock-paper-Scissors". The teams take turns. The player can stay on the field until the signal "BEEP!" sounds from the host. After the signal, he needs to return and pass the move to the opponents. After returning, the player stands at the end of his team (i.e., inside the team, the guys also take turns).

The turning point of the game is the moment when the first player of any team will go all the way and exit the maze, then since the BEEP signal did not sound, the move remains with the same team. The next player of the same team starts his way from the entrance of the maze. A player who has already passed the maze, during the course of his team, stands with his back to the maze next to the leader. After passing the maze, the player has neither the right to prompt his own and the players, nor the right to interfere with rivals.

Methodological recommendations:

• Both the help of teammates and the interfering remarks of rivals should be stimulated and reminded that this is possible. Adjust the volume level of the game yourself by introducing additional rules, for example, about whispering, or vice versa, without limiting the volume of commands.

• It is important to keep the tension in the game until the very end, reminding that you can interfere with the word. Very often, a move goes from one team to another several times because a person makes a mistake. The winner here is the one who can calmly, intently and attentively take step by step.

• Penalty points do not play a role in summing up, the task of the presenter is not to put as many penalties as possible, but to force a constant reminder to get out of the maze the right way. This is also a memory training and a team interaction training, since it is quite difficult for the player himself to get out, he does it at the prompts of his teammates.

• At the end of the game, it is necessary to demonstrate the path drawn by the presenter.

• To make it convenient for the presenter to follow the steps on the field, enter the rule that you need to stand with two feet on each cell.

Procedure 4. Summing up the game

The game result is the victory of one of the teams, all its members receive blue tokens. The presenter paints over the corresponding figures in the fifth column.

Issues that are important to discuss with participants:

• In what order was the transfer of the move within the team? By what principle was the person who was the last to walk in your team chosen, that is, no one could prompt?

• Was it possible for this team to negotiate with the opposing team? At what stages?

• What hindered you the most during your turn?

• What was the tactics and strategy of interfering with the opposing team? Did you agree on this in the team? What tactics could there be?

• What was the hardest part of this game for you? What was the most interesting thing?

2.6 The sixth stage of the program "My Bright World". Game test "Inflating"

The idea of the game was born in the distant 1970s in the student environment, many times it was reworked, supplemented, improved. Its variants are known as "Gamrul", "Intellectual filling" and "Inflating".

This game is aimed at developing imagination, imagination, a sense of humor and, of course, expanding horizons. It serves as a kind of intellectual entertainment.

Procedure 1. Preparation for the game

Divide all the participants into teams, each team has 3-4 people (you can even have 2 people, but not 5). In each team, offer to choose the "voice" of the team – the person who will announce the

decision of the team.

Give each team 7 small pieces of paper (or more, according to the number of planned rounds). The size of the leaf is about 10 cm * 10 cm. Invite the teams to write their name large on the back of each piece of paper.

Procedure 2. Announcement of the rules. Explanation of the procedure for awarding points

Each team is asked to come up with definitions for little-known words. It is necessary to come up with such a definition so that the rest of the teams participating in the game believe in it. After that, all definitions are collected by the presenter, mixed and read out together with the original ones. Alternately, a survey is conducted: who believes in which definition is correct.

The teams are evaluated in three categories:

- the smart team (the largest number of guessed definitions);
- the pump team (the one in whose definitions more teams believed);
- the balloon team (the one that believed in the wrong definition).

The winner is the team with the highest number of points in the nomination "pump", and the team with the highest number of points in the nomination "smart guys". It can be the same command, or it can be several.

Procedure 3. The course of the game

The game can have as many rounds as you want, it all depends on the interest of the participants and the time that the players have. Optimally 6-8, so that everyone has time to understand the rules, play and not get tired. Usually by round 2, the rules become clear to absolutely all children. In an enthusiastic audience, the players themselves ask for continuation and the number of rounds reaches 15.

The order of each round:

1. Announcement of the word by the presenter with mandatory recording or demonstration of its spelling (on the board or on the screen).
2. Time (one to two minutes) for inventing and recording the definition by each team.
3. All teams hand over their leaflets with clearly written definitions to the presenter. The presenter puts all the leaves in his folder. It is convenient if the presenter has a large notebook or A4 folder, so that all the leaves can be laid in front of his eyes. In the same folder there is a sheet with the correct definitions.
4. The moderator reads out all the definitions, the order can be any. Among the definitions recorded by the teams, he reads out the correct one.
5 Time for the teams to discuss which definition they think is correct.
6. The moderator reads out all the definitions again, it is possible and better in a different order.
7. The moderator gives the floor to each team to announce its decision aloud. Only the "voice" of the team announces the decision. Advise the teams not to express their emotions in any way until everyone announces their decision. In the first round, one team announces its decision first, in the next round, the right to speak first is transferred to the next team, etc.
8. After all the teams have spoken, the moderator announces the correct answer and points are awarded. The accrual table should be visible to everyone all the time. It is better to conduct it on a blackboard or a watman.
9. The procedure for awarding points. Points are awarded in the table (see appendix). In this table, Y means smarties, B – cylinders, H – pumps.

◦ First, one point each in the smart guys nomination (marked in red) is awarded to the teams that have chosen the correct answer.

◦ All other teams receive 1 point in the balloons category (marked in green). For example, only the Toddlers answered correctly.

◦ Then the moderator finds out whose definitions the teams believed in. For example, Smileys and a Broom believed in the definition that the Breakthrough came up with, so the breakthrough gets 2 points in the pumps (he inflated two teams at once). And the Breakthrough team itself believed in the definition of the team of Toddlers, so the Toddlers get one point in the pumps nomination.

If the team has chosen its own definition, that is, it has inflated itself, it receives two points at once in the balloons nomination and not a single point in the pumps.

10. After putting the points in the table, the presenter moves on to the next round and calls the next word.

Procedure 4. Summing up the game

To announce the game results, the points are summed up at the end of the game. With equal points in the smart guy category or in the pumps category, you can hold another round or award both teams. "Smart guys" and "Pumps" get blue tokens. The team that "won" in the "balloons" nomination receives the loudest and stormy applause for their credulity as a gift.

During the post-game discussion, it is important to discuss the following issues:

• What was the most interesting and the most difficult for each participant?

• What qualities or skills allow you to win in the pumps category, and which ones in the smart guys category?

• What qualities is the game aimed at developing?

2.7 The final stage of the program "My Bright World"

Like the first stage, the final one is carried out without intermediate tasks.

Procedure 1. Preparation for the game

Divide all the participants in advance into 4 teams. Each participant must have tokens in their hands that they have collected during the year. Tokens differ in color and shape, as well as character qualities corresponding to a particular game stage are indicated on them. Each participant must sign their tokens with a pencil on the reverse side. The number, shape and color of the tokens are reflected in the competition screen. On the playing field, in the nominal (gray) cells, enter the names (if necessary, and surnames) of the guys who have scored more than five tokens during the year and are playing with you on this day. In the white cells, enter the following qualities randomly: imagination, attention, sense of humor, calmness, activity, sociability, politeness, kindness, ability to cooperate, initiative, creativity, ability to plan actions.

To the left and right of the field, put two blank sheets of paper. One is called the "Exchange Point", the second is called the "Token Bank".

Put a deck of purple tokens in the central square of the field – there should be exactly as many of them as there are players.

Put a deck with unsigned tokens in the Token Bank.

If there are 18 players or less, then you need to put 18 tokens: triangles of six colors, squares of six colors, circles of six colors. If the players are from 19 to 30, then you need to put 36 tokens: triangles of two pieces of each color (six colors), squares triangles of two pieces of each color (six colors), circles triangles of two pieces of each color (six colors). The deck must be shuffled and put pictures down.

The exchange point at the beginning of the game is empty.

The necessary props for the game: tokens, a playing field, 4 simple pencils, 4 erasers.

Procedure 2. Explanation of the purpose and rules of the game

It is important to announce that the players who become the owners of purple tokens at the end of the game become the winners of the final game "My Bright World". Players who have scored a full range of tokens in the competition screen, including purple, become winners of the annual program "My Bright World".

We will omit a detailed description of the rules of the game, since its conduct is directly related to the presence of the entire table set: tokens, playing field, scoreboard for scoring, etc. If the teacher has all the above-listed props, then he is a direct participant in the program "My Bright World" and the rules are available to him.

Procedure 3. Summing up the game

The game result is the presence of personalized purple tokens from the guys, which are immediately transferred to the competition screen.

The whole program "My Bright World" is aimed at developing the need for cooperation and promoting the formation of the ability to cooperate with each other. The emphasis is on intellectual cooperation within the team. In the process of summing up, ask the guys:

- are they interested in playing together? study together?
- did they cooperate with each other in this game? What succeeded? What failed?
- which game of this year was remembered the most?
- how have their game strategies changed compared to the first game?
- what would the guys wish each other in the next games next year?

The implementation of the gamified annual program "My Bright World" allows you to take an important step in the development of the team, helps children first under the guidance of a teacher, and then independently achieve success in cooperation with their peers. This article presents a variant of the 2013-2014 academic year, the program is upgraded annually. The program "My Bright World" is the first level of squad life. Further development of the class team can be obtained by working on the programs "Magic Country" and "Fantastic Reality".

Appendix 5

Diary of pedagogical observation

This applendix presents the structure of the diary. The diary is a page-by-page Google form that a group’s tutor, a teacher or a game technician fills out at each stage of the "My Bright World" program.

Section 1. The phases of cooperation are described.
Section 2. The criteria and indicators of the ability to cooperate are presented (Table 3 of this study).
Section 3. Assessment of each participant's ability to cooperate according to indicators after the first stage of the program.
Section 4-11. Questions to the class teacher at each stage.

Question 1. List of commands. The principle of division into teams.
Question 2. How the team commander was chosen. Has he coped with his role at this stage.
Question 3. Were there any conflict situations at the stage of working with intermediate tasks in the stage game.
Question 4. Which phases of cooperation by the team were easy, and which still require the help of a teacher for each of the teams.
Question 5. Were there any interesting situations from the point of view of developing the ability to cooperate on the stage game and while working with intermediate tasks?
Question 6. Game achievements of each team at this stage.
Question 7. What observations do you still want to share?
Section 12. Skill assessment
Section 11. Feedback from the class teacher in a free form based on the results of participation in the program "My Bright World".

Appendix 6

Questionnaire for the participant of the annual game program

Hello, dear participant of the program! All this year we have met at games and discussions. The annual program has been completed, and we ask all participants to answer the following questions. Please answer in detail. The most complete answers will help us in improving our programs, and then next year will be even more interesting. Thanks!

1. What program did you participate in this academic year?
2. What did you like most about this program? Why?
3. What did you dislike most about this program? Why?
4. Which game event was the most interesting?
5. What was the most difficult for you?
6. Have you managed to achieve the status of the winner of the program?
7. Do you think participation in the program has affected your classmates? If so, how?
8. How have classroom relationships changed this academic year?
9. Evaluate the level of your class's ability to cooperate on a 100% scale (0% - we don't know how to cooperate at all, we cooperate 100% perfectly, we cope with any task together)?
10. Has your level of ability to cooperate in the classroom increased this academic year? If so, what contributed to this?
11. Has your classmates' ability to collaborate in class increased this academic year? If so, what contributed to this?
12. What advice would you give to future participants of this program?
13. What grade are you in?
14. Date of filling out the questionnaire

Appendix 7

A brief description of the "Magic Country" program

The "Magic Country" program is intended for students of grades 6-7 who have completed the "My Bright World" program. The program helps classroom teachers of grades 6-7 to make the extracurricular life of the class more intense and interesting, to rally the class team, promotes the development of the ability to cooperate.

"Magic Country" is a flexible game program, the number and content of stages in it is determined by the class under the guidance of a teacher. At the beginning of the school year, we propose to make up each class its own game route, which may consist of a different number of stages: from 4 to 7. The topics of the stages also vary: "Flexibility of mind", "Oratory", "Puppet Theater", "The World through the lens" and others. It is possible to develop a stage with a theme proposed by the class teacher, parents. Throughout the program, at each stage there are elements that require remote communication of participants with game technicians and among themselves, for this, if necessary, training workshops, individual consultations are held on the development of technical communication tools by participants, parents, teachers. The final game stage takes place in the format of a 6-day remote team game.

The action of the program takes place in the form of master classes interconnected by the legend and stage meetings, at master classes teams get acquainted with any kind of skill, after 3-4 intensive team classes, a test game task is organized for the guys. Replacement teams, as well as in the program of the previous level. The game stages are implemented by game technicians in cooperation with the class teacher. The frequency and duration of meetings are agreed in advance.

This annual program is more complex in terms of organizing interaction within the team than the "My Bright World" program. We recommend it to the classes that have passed the "My Bright World" program. But the target result at the end of it is more serious and stable. The class becomes an organized collective, ready to take responsibility for each of its members. The level of cooperation ability of each participant is growing.

Appendix 8

A brief description of the program "Fantastic Reality"

The two-year program "Fantastic Reality" is designed for students who have completed the programs "My Bright World" and "Magic Country", that is, children who have mastered the basic skills of teamwork, who have learned to overcome the difficulties of cooperation with various people. Recommended age of participants: 7-8 grade.

"Fantastic Reality" is a flexible intellectual and cognitive game program, the number and content of blocks or game modules in it is determined by the class under the guidance of a teacher. There may be 2-3 thematic game modules during one academic year. The duration of each module is two to three months. Each module includes a series of intelligent team games, a discussion club, and a role-playing game workshop. To conduct intellectual games of discussion clubs, game technology teachers come to the class, the venue of the seminars is agreed. We suggest that at the beginning of the school year, each class should have its own stage route.

We offer the following themed game blocks to choose from:

1. The role of science in the development of human civilization
2. In search of extraterrestrial intelligence
3. Creation of artificial intelligence
4. Intercultural dialogue
5. Youth subcultures
6. Riddles of the planet

and others.

It is possible to develop a stage with the topics proposed by the class.

Game blocks are implemented by game technicians in cooperation with the class teacher. The frequency and duration of meetings are agreed in advance. The figure shows a diagram of the growth of game statuses for participants.

In this program, team and collective successes directly translate into personal achievements of each participant. During the implementation of team seminar projects by microgroups, each participant simultaneously implements an individual educational project, creating his own website on the topic of interest and agreed upon.

Organizational aspects of the game program "Fantastic Reality"

Every child participating in the program of the third level is registered on our website. A section has been created on the website, only for participants of the third annual program, where their main activities and their results are presented.

So, the game begins. Throughout the upcoming school year, the children's task is to assemble a super-computer. At the beginning, all computers are in the same position.

During the first year, they will have to equip their computer with all the necessary components.

After each seminar and discussion club meeting on the website, points will be awarded to the children in their "personal piggy bank". In order to find out how many points are earned, the child must go to the site's forum and open the page where the online gaming store is located. As a result, he will be able to purchase the necessary components and office equipment (printer, scanner, fax, copier), as well as add-ons in the virtual store. Also, all kinds of promotions, discounts, and new product arrivals are systematically organized in the store.

All children work at seminars and discussions in teams of 5-6 people (team name, motto), but earn points ("coolies") individually. Earned "coolies" are credited to the team. "Pumping" is needed in order to give the title to children. You can get the highest rank by earning the most points and buying everything you need for a computer (additional tasks will be given at seminars). Subsequently, when they join new teams to work on the site, the number of points scored makes it possible to rank all children according to the development of programs.

Before the third seminar, all children are grouped together. On the website, these groups will be

called "local networks". The most "pumped" of the team will receive the status of the "brain of the team". He can become her commander. If he does not become one, he gets the opportunity to lead decision-making related only to computer technology. In this case, he does not have the right to lead the team.

A website is the first step to creating a project by a team, and already at this stage the team chooses a topic for their future project. Accordingly, the site will be executed with all the necessary technical requirements. Before creating a website, all "local networks" are on equal starting positions. At the discussions held in the club, it will be checked which technologies were used to create the site, after which the teams will be awarded points based on the results of the work done. Whoever scores more points ("krutyg") moves forward. It is also planned to create an "exchange point" where children will share the information found with each other, calculating the accumulated points, and a "resource center" where they will be able to leave applications for masters. Based on the results of the presentation of the site and the results of scoring, it will be possible to determine the best teams of the third level.

The websites created by the guys with their team projects will be posted on the Internet, and links have been posted on the site www.naskok.ru (not available now); .

Criteria for evaluating teams at seminars

("krutygi" are given to each team member depending on the overall team score):

1 quality of tasks (fulfillment of the necessary technical minimum);

2 task completion speed; 3 creativity.

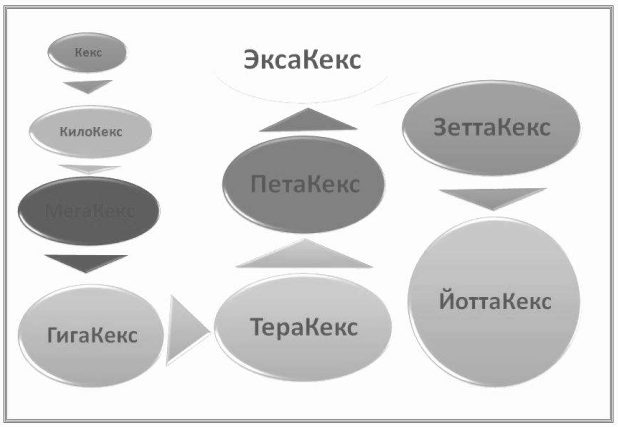
At the end of each seminar, teams are given a task on a specific topic related to the life and activities of the Foundation (when completing the task, programs that were studied at the seminar should be used).

The presentation of completed tasks is carried out by the whole team.

Criteria for evaluating works: a) originality; b) technical skill;c) mandatory use of all studied options.

Hierarchy:

Stages of "Fantastic reality".



First year of study

1. Preliminary lesson
2. I seminar
3. Discussion Club
4. Consultation system
5. II seminar
6. Consultation
7. Discussion Club
8. III seminar

Before the seminars, an introductory event is held for those who do not know how to work with a computer. In this lesson, the masters and the guys who have good computer skills will tell you about its components, what programs there are and what they are needed for.

A role-playing game combining all the listed organizational and structural aspects will unfold gradually before the participants.

Let's play!

Appendix 9

An example of an application from a class to join the annual program

Государственное бюджетное общеобразовательное учреждение
Средняя общеобразовательная школа № 335
Пушкинского района Санкт–Петербурга

Заявка на участие класса (отряда) в программах
Международного общественного фонда
поддержки детско-молодёжных отрядных движений
«КРЫЛАТЫЙ ЕДИНОРОГ»

Просим принять **6 «Г»** класс (отряд) ГБОУ СОШ №335 для участия в годовой программе **«Мой Яркий Мир»** с 1 сентября 2013 года.

С правилами участия и содержанием программ ознакомлены.

Обязуемся обеспечить организационную поддержку программ.

Директор школы Чулицкая И.П. /

Классный руководитель Ортикова С.Г. /

М.П.

«18» сентября 2013г

Appendix 10

SOCIOMETRIC TEST
Test instructions for teachers

Required material: a form for each child, a class list (posted on the screen / blackboard or given to everyone).

Oral instructions. An example text may be as follows: "As your homeroom teacher, I am interested in everything that concerns the relationships within our class team, I am trying to figure out whether he is friendly or not, and if not, why. In order for our further work to be interesting and useful, it is important for me to understand what our class is. To do this, I want to use a technique with the tricky name "sociometry". It consists of five questions. Here are the test forms. There will be five questions in total. I'll read them out loud. Questions and simple ones? and complex at the same time. They concern our class, the relationship between the guys and each of you personally. In order for the work not to be in vain, it is very important to take it seriously and be as sincere as possible when answering. And also, the work must be signed. Only I and Juliana Pavlovna will read your forms. When you hear the questions, you will realize that without a signature, it loses all meaning. Of course, I can mark the sheets distributed to you or conduct a graphological examination, but I trust you.

For my part, I guarantee that your answer sheets will not fall into the hands of anyone: neither your classmates, nor teachers, nor parents. Only I and my assistant, the results handler, a person who doesn't know you, will see them.

It is indecent to consult, discuss aloud, look at the sheet of a neighbor on the desk: this is not a math test, but a personal point of view of each of you, which you do not have to share with classmates.

For each question, you will need to choose three people from our class, writing clearly and completely their first and last name.

And write the most suitable one in your opinion first. For example, the question is: do you need to make a football team only from classmates. Who do you think will be the best goalkeeper?

1. Here write the name and surname of the most suitable classmate in your opinion.
Svetlova Rita (No. 17)
2. Here write the one you would choose if the first one was ill or was away.
Dima Krugkin (No. 12)
3. Here write the one you would choose if the first two were ill.
Nikita Pyatkin (No. 15)

You can't write yourself. When answering, do not forget those who are absent today. In addition to the last name, specify the number in the list. To do this, you have a class list.
Before you start work, write your first name, last name and class."

Last name and first name
Class
Testing date

You have 2-3 minutes for each question.
1. If you had to go to another school, which of your current classmates would you take to a new class?
II. And which of your current classmates would you not take to your new class?
III. Which of your classmates do you think would take you to their new class if you moved to another school?
IV. Please indicate the names of those classmates who, in your opinion, will not want to take you to their new class.
V. If you were offered to look at the answers to these questions of your classmates, whose answers would you like to see? Write their surnames in order of importance to you. Under the first number — the surname of the one whose

After finishing, immediately collect the forms. If possible, do a survey later of those children who were absent on the day of the sociometry. We also ask you to review the forms, and if the children have not written down the surnames or names of their classmates completely, or forgot to specify a number from the list, add the missing letters/numbers with a pencil.
For processing, we need all the survey forms and the class list with the numbering that you provided to the children.

Appendix 11

The program of the advanced training course
"Educational gamepractice in the context of the implementation of the Federal State Educational Standard"

The course was conducted on the basis of the IMC Krasnoselsky district in 2013-2014.

Explanatory note
to the educational program of advanced training (36 academic hours)

"Educational gamepractice in the context of the implementation of the Federal State Educational Standard"
Relevance of the program

In philosophical, cultural, psychological studies, the game is considered as an activity that has the property of universality, i.e. the ability to integrate all human qualities (rational and extra-rational, intellectual and emotional) and thereby maintain, restore the integrity of the personality so necessary in the process of personal development. Since the main feature of play activity is free, creative activity, its implementation in the pedagogical process contributes to self-actualization, self-determination of the individual, which is the fundamental goal of modern education.

In modern pedagogy, play is often used as an active form of motivation in the classroom, but rarely and fragmentally as a form of organizing activities outside of school hours. In their free time from intensive school and independent home schooling, children perceive the game only as a spontaneous entertaining action, which is most often what it is. Virtual game worlds that are widespread in the adolescent environment, which directly affect the development and formation of a child's personality, are in most cases lost from the attention of teachers. However, in the modern information society, game mechanics are used in many non-gaming areas and are a natural factor in the development of such a society.

A well-thought-out logically constructed system of educational games, informatively filled in a certain way, united by a common game shell is the subject of consideration and implementation in extracurricular activities of children quite rarely. In such a game shell, not only the cognitive process associated with specific school disciplines can be enclosed, but also the educational process associated with the formation of each student's personal culture and mastery of key meta-subject competencies, which is especially relevant in the context of the implementation of the Federal State Educational Standard.

There is a contradiction between the possibilities of educational games and gamification as a pedagogical tool and its insufficient use in scheduled and extracurricular activities at school.

The purpose of the program: to reveal the methodological foundations and methods of using educational games, to present the modern practice of using games for educational purposes, their adaptation and effective integration into the educational and educational process, familiarity with the process of gamification as a pedagogical technology, familiarity with the methodology of developing and modifying educational games for tasks.

Program objectives:

- based on the analysis of pedagogical concepts to show the importance and prospects of the use of the game and gamification in education;
- to present various approaches to the design of educational games;
- consider different typologies and classifications of games,
- to consider the main types of gamification in the modern educational process and demonstrate

the specifics of the gamification of extracurricular activities as a pedagogical technology;
- to achieve an understanding of the role and effectiveness of game formats in modern education, including in the context of the implementation of the Federal State Educational Standard.
- to master modern methodological techniques for developing, adapting and embedding game formats in the educational and educational process within the framework of regular and extracurricular activities.

Audience category: deputy heads of educational organizations, primary and primary school teachers, classroom teachers, social educators, teacher organizers, university teachers.

Practical significance of the program. The realization of the course goal will allow the listener to systematize the material on the use of games in modern education, choose their own strategy for embedding games in the educational and educational process within the framework of regular and extracurricular activities, get acquainted with the basics of gamification as a pedagogical technology, which will increase the effectiveness of the educational process.

The structure of the program consists of educational blocks reflecting the content of four sections: "Game as a pedagogical and socio-cultural phenomenon", "The role and place of games in the construction of the educational environment", "Gamification of education in a network society", "Algorithm for the development and modification of educational games".

Planned learning outcomes:

As a result of training in the educational program of advanced training, the student will:

know:
- basic concepts of educational game practice,
- typologies of games,
- approaches to the design of educational games,
- modern trends in the development of educational game practice.

be able to:
- to determine the educational potential of specific game formats,
- to effectively integrate an educational game into the educational process,
- modify collective games for pedagogical tasks,
- develop educational subject and meta-subject games.

own:
- technology of modification of educational games for the task,
- the methodology of gamification of educational processes.

Forms of control:

The result of the training is revealed on the basis of the current and final control. The forms and types of control are reflected in the curriculum. The form of final control is the protection of projects.

№	Name of sections, disciplines	Total hours	Including		Form of control
			Lectures	Practical exercises	
1	The game as a pedagogical and socio-cultural phenomenon	4	2	2	Control questions
2	The role and place of the game in building an educational environment	12	4	8	Control questions
3	Gamification of education in a networked society	8	2	6	Practical exercises
4	An algorithm for developing and modifying an educational game	12	4	8	Project protection
	Total:	36	12	24	

The compiler of the program: Oleinik U.P.

THE EDUCATIONAL AND THEMATIC PLAN
of the educational program of advanced training

"Educational Gamepractice IN THE CONTEXT OF THE IMPLEMENTATION OF THE Federal State Educational Standard"

Purpose: familiarity with the use of games in modern education familiarity with the modern practice of using games for educational purposes, their adaptation and effective integration into the educational and educational process, familiarity with the process of gamification as a pedagogical technology, mastering the methodology of developing gamified extracurricular programs within the framework of the Federal State Educational Standard.
Audience category: deputy heads of educational organizations, primary school teachers, primary school teachers, tutors, classroom teachers, social educators, teachers-organizers.
Duration of training: 36 hours

№	Name of sections, disciplines	Total hours	Including		Form control
			Lectures	Practical exercises	
1	**The game as a pedagogical and socio-cultural phenomenon**	4	2	2	Control questions
1.1	The essence and potential of the game. Types of gaming cultures	1	1	0	
1.2.	The main approaches to game design in the history of education	2	1	1	
1.3	Некоторые классификации и типологии образовательных игр	1	0	1	
2	**The role and place of the game in building an educational environment**	12	4	8	Control questions
2.1.	Basic concepts of educational gamepractice	2	2	0	

2.2.	The use of games at various levels of education	6	2	4	
2.3.	Targeted embedding of the game in the educational environment	4	0	4	
3	**Gamification of education in a networked society**	8	2	6	Practice
3.1.	Gamification as an element of Information Society culture	1	1	0	
3.2.	Gamification in education	2	1	1	
3.3.	Methodology for the development of an infected program for the organization of extracurricular activities	5	0	5	
4	**Algorithm for designing and modifying an educational game**	12	4	8	Methodological development
4.1	Analysis of the structure of the collective game based on the morphological approach	4	2	2	
4.2	Algorithm for modifying the structure of the collective game	4	2	2	
4.3	Development of an educational game for the task	4	0	4	

Thematic plan
of the professional development program

"Educational game practice in the context of the implementation of the Federal State Educational Standard"

1 Game as a pedagogical and socio-cultural phenomenon

1. 1. The essence and potential of the game. Types of gaming cultures

The phenomenon of "game": essential characteristics. The game as a subject of study of various sciences. Intuitive, romantic, predictive and hedonistic types of gaming cultures. Polyfunctionality of the game. The pedagogical potential of the game in the history of education.

1.2. The main approaches to the construction of the game in the history of education

Structural elements of the game, significant in the educational process. The construction of the game as a subject of consideration by theorists and practitioners of education of the 17th- 20th centuries.

1.3. Some classifications and typologies of educational games

Typologies and classifications of children's games. Typologies of educational games. Types of modern educational game practice.

2. The role and place of the game in building an educational environment

2.1. Basic concepts of educational game practice

Game and non-game result of the game. Creating an atmosphere, keeping the rhythm of the game. Support for the principle of voluntary participation in the game. The organizers of the game as holders of the rules of the game. Development of the game's springboard.

2.2 The use of games at various levels of education

Tasks that can be solved with the help of a game at various levels of education in the context of the implementation of the Federal State Educational Standard. The game as a means of achieving subject and meta-subject results.

2.3 Targeted embedding of the game in the educational environment

Examples of using the game as the main and additional component of the educational environment. Principles of embedding the game in the educational environment. The risks of using the game for educational purposes.

3. Gamification of education in a networked society

3.1. Gamification as an element of Information Society culture

Network society and information society: characteristics, essential features. Problems and contradictions of the development process of the network society. Gamification as an element of the culture of the information society. Gamification as a need of a network society

3.2. Gamification in education

Examples of the introduction of gamification at different levels of education. Principles of gamification of education.

3.3. Methodology for developing a gamified program for organizing extracurricular activities

Stages of development of gamified shells for various processes. Methodology for developing scenarios of a gamified program. Pedagogical design in the gamification of processes.

4. Algorithm for designing and modifying an educational game

4.1. Analysis of the structure of the collective game based on the morphological approach

Morphological approach in the works of F. Zwicke. Morphological box method. Layering of the

game based on the morphological box method. Analysis of the structure of collective games of various types based on the morphological approach.

4.2. Algorithm of modification of the collective game structure

The main limitations when modifying a collective game that is planned to be used for educational purposes. Steps of the modification algorithm. The practice of applying the algorithm on the example of educational over-subject intellectual games.

4.3. Development of an educational game for the task

An algorithm for developing an educational game. Limitations and directions of development of collective games design. The practice of developing your own educational game to solve the problems of achieving subject and meta-subject results.

Appendix12

Structured conversation with the class teacher

Questions discussed during the conversation with the class teacher at the first cycle of the implementation of the program "My bright world"

1 The number of children, the ratio of girls and boys.

2 Characteristics of relationships in the classroom.

3 Leaders in the class: positive and negative.

4 Groupings in the classroom, according to which principle children are united in communities, interest groups.

5 Joint cases that were organized in the last academic year in the classroom, how they were prepared and passed.

The 6th level of the class group on the scale of A.N., Lutoshkin.

7 What are the pedagogical expectations from participating in the "My Bright World" program

Appendix 13

Sociogram of one of the classes of participants in the program "My Bright World"

The study was conducted before the start of the program.
Research Report
General properties
Research: Research 6B, Shopping center, Lenobl (2013-2014, beginning)
Criterion: If you had to go to another school, which of your current classmates would you take to a new class?
Group of participants: 6B, TC, Len region (2013-2013)
Maximum number of selections that can be made: 6
Negative choices are allowed: Yes

Description:
Index Reference
Density - The index characterizes the density of the structure of the group's relationships.
Cohesion - The index characterizes the strength (degree) of mutual attraction of customers in a group.
Stability - The index characterizes which minimum part of the group must leave it in order for this group to break up into subgroups that are unrelated to each other.
Tension - The index characterizes the degree of customer dissatisfaction with emotional relationships in the group.
The weight index characterizes which part of the group considers the i-th client significant under this criterion.
Emotional expansiveness - The index characterizes which part of the group is significant for the i-th client of the group under this criterion.
Satisfaction - The index characterizes which part of the choices made by the i-th client of the group is mutual.
The status Index characterizes how attractive the i-th client of the group is for selection.

Customer Group Group indexes for positive choices

Density	**Cohesion**	**Stability**	**Tension**
0,14	0,132	1,87	0,147

Group indexes of client participants for negative selections

Density	**Cohesion**	**Stability**	**Tension**
0,136	0,132	2,33	0,257

Individual indexes of participants for positive elections

Client	**weighting**	**Emotional expansiveness**	**Satisfaction**	**Status**
Polovko Nataliya	0,188	0,125	1	0,25
Baranova Ekaterina	0,0625	0,188	0,333	0,25
Minenkov Andrew	0,313	0,188	0,667	0,375
Chukalova Anastasiya	0,125	0,188	0,667	0,25
Kataev Vladimir	0,188	0,188	0,667	0,375
Ivanov Maxim	0	0,188	0	0
Kinaschuk Masha	0,188	0,188	0,667	0,25
Kozhevnikov Nil	0,0625	0,188	0,333	0,188
Mordovin Alexey	0,25	0,188	0,667	0,313
Nikoshenko Nikita	0,125	0,188	0,667	0,188
Nishonov Sasha	0,188	0,188	0,333	0,438
Kochetkov Maxim	0,375	0	0	0,688
Kurochkin Denis	0,125	0,188	0	0,188
Vanushev Kirill	0,0625	0	0	0,25
Daruev Vanya	0	0	0	0,5
Vasiliev Daniil	0,0625	0,188	0,333	0,125

Chirikova Ksusha	0,0625	0	0	0,0625

Individual indexes of participants for negative elections

Client	**weighting**	**Emotional expansiveness**	**Satisfaction**	**Status**
Pololvko Natalya	0,0625	0,188	0	0,25
Baranova Ekaterina	0,188	0,188	0	0,25
Minenkov Andrew	0,0625	0,188	0	0,375
Chukalova Anastasiya	0,125	0,188	0	0,25
Kataev Vladimir	0,188	0,125	0	0,375
Ivanov Maxim	0	0,125	0	0
Kinaschuk Masha	0,0625	0,188	0	0,25
Kozhevnikov Nil	0,125	0,188	0	0,188
Mordvin Alexey	0,0625	0,188	0	0,313
Nikoshenko Nikita	0,0625	0,188	0,333	0,188
Nishonov Sasha	0,25	0,188	0,333	0,438
Kochetkov Maxim	0,313	0	0	0,688
Kurochkin Denis	0,0625	0,188	0	0,188
Vanushev Kirill	0,188	0	0	0,25
Daruev Ivan	0,5	0	0	0,5

Vasilev Daniil	0,0625	0,188	0	0,125
Chirikova Ksusha	0	0	0	0,0625

Participants ordered by the number of incoming positive choices

Client	Number of selections
Kochetkov Maxim	6
Minenkov Andrew	5
Mordvin Alexey	4
Polovko Natalya	3
Kataev Vladimir	3
Kinaschuk Masha	3
Nishonov Sasha	3
Chukalova Anastasiya	2
Nikoshenko Nikita	2
Kurochkin Denis	2
Baranova Ekaterina	1
Kozhevnikov Nil	1
Vanushev Kirill	1
Vasiliev Daniil	1

Chirikova Ksusha	1
Ivanova Maxim	0
Daruev Vanya	0

Clients ordered by the number of incoming negative selections

Client	**Number of selections**
Daruev Vanya	8
Kochetkov Maxim	5
Nishonov Sasha	4
Baranova Ekaterina	3
Kataev Vladimir	3
Vanushev Kirill	3
Chukalova Anastasiya	2
Kozhevnikov Nil	2
Polovko Nataliya	1
Minenkov Andrew	1
Kinaschuk Masha	1
Mordvin Alexey	1
Nikoshenko Nikita	1

Kurochkin Denis	1
Vasiliev Daniil	1
Ivanov Maxim	0
Chirikova Ksusha	0

Clients ordered by the number of incoming positive selections

Client	Number of selections
Baranova Ekaterina	3
Minenkova Andrew	3
Chukalova Anastasia	3
Kataev Vladimir	3
Ivanov Maxim	3
Kinaschuk Masha	3
Kozhevnikov Nil	3
Mordvin Alexey	3
Nikoshenko Nikita	3
Nishonov Sasha	3
Kurochkin Denis	3
Vasiliev Daniil	3

Polovko Nataliya	2
Kochetkov Maxim	0
Vanuschev Kirill	0
Daruev Vanya	0
Chirikova Ksusha	0

Clients ordered by the number of negative choices coming out

Client	Number of selections
Polovko Nataliya	3
Baranova Ekaterina	3
Minenkov Andrew	3
Chukalova Anastasiya	3
Kinaschuk Masha	3
Kozhevnikov Nil	3
Mordvin Alexey	3
Nikoshenko Nikita	3
Nishonov Sasha	3
Kurochkin Denis	3
Vasiliev Daniil	3

Kataev Vladimir	2
Ivanov Maxim	2
Kochetkov Maxim	0
Vanushev Kirill	0
Daruev Vanya	0
Chirikova Ksusha	0

Clients ordered by the number of positive choices coming out

Client	**Number of selections**
Polovko Nataliya	2
Minenkov Andrew	2
Chukalova Anastasiya	2
Kataev Vladimir	2
Kinaschuk Masha	2
Mordvin Alexey	2
Nikoshenko Nikita	2
Baranova Ekaterina	1
Kozhevnikov Nil	1
Nishonov Sasha	1

Vasiliev Daniil	1
Ivanov Maxim	0
Kochetkov Maxim	0
Kurochkin Denis	0
Vanushev Kirill	0
Daruev Vanya	0
Chirikova Ksusha	0

Clients ordered by the number of mutual negative choices

Client	**Number of selections**
Nikoshenko Nikita	1
Nishonov Sasha	1
Polovko Nataliya	0
Baranova Ekaterina	0
Minenkov Andrew	0
Chukalova Anastasiya	0
Kataev Vladimir	0
Ivanov Maxim	0
Kinaschuk Masha	0

Kozhevnikov Nil	0
Mordvin Alexey	0
Kochetkov Maxim	0
Kurochkin Denis	0
Vanushev Kirill	0
Daruev Vanya	0
Vasiliev Daniil	0
Chirikova Ksusha	0

Participants ordered by the number of incoming positive and negative choices

Client	**Number of selections**
Kochetkov Maxim	11
Daruev Vanya	8
Nishonov Sasha	7
Minenkov Andrew	6
Kataev Vladimir	6
Mordvin Alexey	5
Polovko Nataliya	4
Baranova Ekaterina	4

Chukalova Anastasiya	4
Kinaschuk Masha	4
Vanushev Kirill	4
Kozhevnikov Nil	3
Nikoshenko Nikita	3
Kurochkin Denis	3
Vasiliev Daniil	2
Chirikova Ksusha	1
Ivanov Maxim	0

Participants, ordered by the number of positive and negative choices coming out

Client	**Number of selections**
Baranova Ekaterina	6
Minenkov Andrew	6
Chukalova Anastasiya	6
Kinaschuk Masha	6
Kozhevnikov Nil	6
Mordvin Alexey	6
Nikoshenko Nikita	6

Nishonov Sasha	6
Kurochkin Denis	6
Vasiliev Daniil	6
Polovko Nataliya	5
Kataev Vladimir	5
Ivanov Maxim	5
Kochetkov Maxim	0
Vanushev Kirill	0
Daruev Vanya	0
Chirikova Ksusha	0

Pairs of clients with positive mutual choices

Chukalova Anastasia - Polovko Natalia, Kinashchuk Masha - Polovko Natalia, Kataev Vladimir - Baranova Ekaterina, Mordvin Alexey - Minenkov Andrey, Nikoshenko Nikita - Minenkov Andrey, Kinashchuk Masha - Chukalova Anastasia, Nishonov Sasha - Kataev Vladimir, Vasiliev Daniel - Kozhevnikov Nil, Nikoshenko Nikita - Mordvin Alexey.

Pairs of clients with negative mutual choices

Sasha Nishonov - Nikita Nikonenko.

List of participants, ordered by authority

Client	**Weighting**
Kochetkov Maxim	0,375

Minenkov Andrew	0,313
Mordvin Alexey	0,25
Polovko Nataliya	0,188
Kataev Vladimir	0,188
Kinaschuk Masha	0,188
Nishonov Sasha	0,188
Chukalova Anastasiya	0,125
Nikoshenko Nikita	0,125
Kurochkin Denis	0,125
Baranova Ekaterina	0,0625
Kozhevnikov Nil	0,0625
Vanushev Kirill	0,0625
Vasiliev Daniil	0,0625
Chirikova Ksusha	0,0625
Ivanov Maxim	0
Daruev Vanya	0

List of clients ordered by rejection

Client	**Weighting**

Daruev Vanya	0,5
Kochetkov Maxim	0,313
Nishonov Sasha	0,25
Baranova Ekaterina	0,188
Kataev Vladimir	0,188
Vanushev Kirill	0,188
Chukalova Anastasiya	0,125
Kozhevnikov Nil	0,125
Polovko Nataliya	0,0625
Minenkov Andrew	0,0625
Kinaschuk Masha	0,0625
Mordvin Alexey	0,0625
Nikoshenko Nikita	0,0625
Kurochkin Denis	0,0625
Vasiliev Denis	0,0625
Ivanov Maxim	0
Chirikova Ksusha	0

Appendix 14

Game methods of dividing into teams

Collected during the practice of the author of the study. The sources are very different: the school of leadership skills, pedagogical folklore, collections of recommendations for educators of children's health camps and others.

Tree. This is probably one of the most famous and universal ways to divide a large group into teams. It is good because it almost does not require the participation of the presenter and allows you to get rid of the dissatisfaction of the participants about the composition of the teams. The secret is that the participants themselves choose the composition of the teams. The presenter only controls the order of selection. So, from the group, according to the number of teams, several guys are selected. Each of them chooses one person for his team. Those who have been chosen, in turn, choose the following. So, along the chain, it continues until all participants are chosen.

Zoo. All participants are standing or sitting in a circle. The presenter, walking in a circle, tells everyone the name of an animal in their ear. As many commands you want to make, so many types of animals need to be named. For example, if three commands are needed, then let the animals be a dog, a cat and a mouse. When everyone knows the animal that he will represent, players need to join teams consisting of animals of the same species. An indispensable condition is that you can't say anything out loud. You can imitate the behavior of "your" animal, make sounds characteristic of it, etc. Once the game is over, you will have the teams you need.

Magic colors. This type of division is similar to the previous one. But, instead of the names of the animals, the presenter draws a point of a certain color on the forehead of each player with a cosmetic pencil. You can glue a colored piece of paper on your back. When the dots are drawn to everyone, the guys need to get together in color teams without saying a word.

Molecules (Atoms and molecules). Every child is an atom. The host dictates the speed of the atom (from 1 to 3 (or up to 4-10, the more the more difficult)). All children, respectively, begin to move at a given speed from a slow step (1st speed) to a fast step (3rd or 10th speed). As you know, the atoms in the gas fill all the free space and, accordingly, the children fill all the empty parts of the room under the guidance of the presenter. Periodically, the leader commands the molecules in twos (three, four ...). The atoms combine into molecules and freeze... When the presenter sees that the game ceases to be interesting, he calls the molecules by "as many people as needed in the team" and receives his commands. Moreover, in this case, there are people in the team who sympathize with each other, or at least do not conflict.

Code operation (it is convenient to put specific people together in one team if necessary). Each player approaches the presenter (or one of the presenters) and calls a number. The presenter, after reflection, sends to one of the teams. In fact, the presenter does not make any calculations, but distributes them wherever he wants. The convenience is that the presenter can make such commands as he wants, and it will seem to the participants that the distribution is random. It makes sense to say that everyone should call different numbers. You can also ask the guys to guess the code operations that the presenter performs.

Animals. The host whispers the name of one of the n animals in each player's ear. Next 2 options:

1. You need to portray the animal that was whispered to you and get together in a team.(Here they often give a rabbit and a kangaroo among the animals)
2. You need to make sounds of this animal with your eyes closed and again gather in teams.

Ribbons (or any other draw)

Ribbons of the required number of colors are cut into the cap, each one pulled a ribbon... then, based on the color, they disperse into teams.

Puzzle postcard. Several postcards (how many teams are needed) are cut into pieces (there are as many parts as there will be a person in the team). Everyone pulls out a piece of a postcard. The first task is to collect postcards, pieces cannot be passed to each other. Those who collected one postcard are on the same team.

Pinecone, herringbone, wand (You can pick up any words)

The presenter goes along the guys and lists "Pinecone, herringbone, wand ...", pointing to the guys. Accordingly, then the "Cones" form the first team, the "Christmas Trees" - the second, and the "Sticks" - the third.

The same figure (also a type of draw)

A variety of shapes are needed (circles, triangles, squares, etc.), the variety of shapes depends on the required number of teams, the number of identical shapes depends on the number of players in the team. The guys who have chosen the same figure form one team.

What's in my name for you? Before the event, the moderator analyzes the names and surnames of the children and invites them to make teams by: the number of letters in the name; the number of vowels or consonants in the name, etc.

In continuation of this topic, you can analyze in advance who will get into one team if you suggest splitting up by:

· birth season (autumn, winter, spring, summer);
· by hair length;
· by date of birth (even/odd)
· eye color, etc.

With a calendar sheet. All players are pinned on the chest on a sheet from a tear-off calendar. The sheets should be arranged so that the players can complete the tasks listed below.

1. Assemble a team consisting of five identical days of the week (Tuesdays, Thursdays or Fridays, etc. — it doesn't matter, the numbers don't matter).
2. Assemble a team consisting of all seven days of the week (date, month have no meaning).
3. Gather so that the year 1982 is formed (or another, at the direction of the head).

Call signs. First, the number of required commands is determined (for example, four). In advance of the game, names, words, numbers are written on a paper square: ("13" "01",. "666", "911"). It is necessary to unite into groups with the same name as soon as possible. To do this, after receiving a paper square and reading the word written on it, you need to find guys who have the same pieces of paper, and, shouting this word, assemble your team.

Fuss. Each player is told by the presenter in his ear what he needs to do (pinch, shake hands, click on the nose, etc.). The number of various actions depends on the number of commands. The players walk in silence and look for their team members by their actions.

Mirror. For arbitrary division, you can use a "mirror": one participant turns his back, the counselor points to someone and asks the "mirror" which team to identify this person.

Who am I. In advance: Choose a topic that will be a success for children, for example, popular movies or TV stars, musicians, songs, movies, or TV shows. If you have an older group, then you may have a wider range of topics and more complex choices. And so, let's use, well, for example cartoon characters. Write the names of cartoon characters on small cards. Make sure the names are clear. Play: Make everyone turn away. Attach a pin or tape it or throw a card with the name on their back (if the card is hanging on a string around their neck) (but so that they do not see what is written). Everyone now has to ask questions to each other regarding their (character cards). The answers can only be “yes” or “no". Once they guess what is written, they can place a card in front to indicate that they have completed the task. This is also a great way to divide into subgroups. With cartoons, you could have all the characters for different famous cartoons in groups.

Division into subgroups by subjects united by one name (attribute). You offer each child to take one subject and find an object suitable for him from others. Children gather in small groups and clarify why they have gathered together. For example, you distribute pictures of animals,

birds and fish (6 pieces each). Each child takes one picture and finds who else has fish (birds, animals). Thus, it turns out 3 groups of 6 people. They can tell others why they got together (or the rest should guess it). As a material, you can use: individual small objects that can be combined by name or by some attribute into one group; geometric shapes that are the same in color and size, but different in name (for example, 6 red circles, 6 red squares, 6 red triangles, etc.); geometric shapes that are the same in size name and color, but different in size (for example, 6 large red triangles, 6 small red triangles, 6 small green squares); small toys or pictures of animals, birds, fish, insects, vehicles, etc.; dummy or silhouette images of vegetables, fruits, trees; household items: clothing, shoes, dishes, fabric. At the same time, the total number of subjects should correspond to the number of children in the group, and they should be selected so that they can be divided into several — depending on the number of children — small groups.

Unification by forming pairs (triples, fours, sixes)

You offer each child an individual task, and after completing it, he must find a friend with whom he can combine the results of the tasks. Then each couple finds another couple or two, and thus a small group is created that is able to continue further work.

The game "Find a twin" — children are divided into pairs by "similarity" and must explain to everyone what they are like, having previously discussed it in their pair.

Colored letters. Cards are prepared according to the number of participants with letters of different colors, so that letters of the same color are composed into a word. The number of letters in a word is equal to the number of participants in the team.

Appendix 15

Description of the diagnostic game "TetraKom"

Description of the course of the game "TetraKom"

There are 12 tetramino figures hidden on the 7*7 field: three red, three blue, three green and three yellow. In addition to the colored cells, there is a bonus cell on the field.

The group of players is divided into 4 teams. Each team represents one of four colors: red, yellow, blue, green.

The first batch

Each team is given three figures of its own color (different tetramino figures).

The goal of the teams is to put all the pieces on the field.

Rules

1. The teams take turns. The circle of moves is set to Red-> Yellow->Green-> Blue. To make a move, one player from the team approaches the main field and names the cell (for example, B7) that he wants to open, or names 4 cells for laying out a specific figure.

2. In one move, you can either open only one cell, or lay out only one piece, or remove your piece from the field.

3. If a piece is placed on the field incorrectly, the team loses this piece.

4. When the bonus cell is opened, the team receives a card with a bonus sign. The team has the right to change this sign in its turn from the leader to any figure of its color.

5. The game ends when at least one team has laid out all the pieces of its color on the field, and the next round of moves is completed.

Prohibitions:

1. You cannot take pictures, sketch, or record anything while you are at the main field.

2. You cannot cut, tear, fold or change the shape in any other way.

3. You cannot transfer the pieces to another team.

4. You can't skip your turn.

Violation of rules and prohibitions leads to penalty points. Two penalty points entails the loss of a figure (any of the choice of the presenter, including, can be removed already laid out figure on the field).

Note.

All figures are two-sided. They can be rotated and flipped.

The second and subsequent batches

Each team is given 5 different pieces of its own color.

The goal of the teams is to put all the pieces on the field in the minimum number of moves.

Clarification of the rules: At the beginning of the game, the teams have 5 minutes of free communication for agreements and building a common strategy. Then oral communication between the teams is prohibited. You can negotiate only with the help of letters on the mailbox. The number of emails is unlimited. At any moment of the game, the team can leave any number of letters on the table. With the letter, you can transfer the bonus card to another team. It is necessary to write "to" and "from" on the letter (for example, "blue from red"). A team representative can take letters addressed to his team from the table only on his own turn.

The leader counts the number of moves made by circles, making notes after each circle.

Special software is needed for the game.A notebook

The game "TetraKom" is an introductory game of the program "My Bright World". For the participating guys, it is not connected with the general legend of the program. And from a teacher it may just sound like an offer to try your hand at a team puzzle.

It contains several lines

diagnostic line that helps the teacher to determine the level of need for cooperation of group members (students), as well as the ability to cooperate and achieve team goals; stereotypical line. This game is the first step in breaking the stereotype that they play only for the sake of

defeating an opponent. There is no opponent in this game, there are only the rules of the game and a given way of arrangements; strategic line. Building a team strategy, as well as an effective distribution of responsibilities is the basis of our collective games; a line of effective communication.

Procedures of the game

Procedure 0. Introduction.

The text can be something like this. "Guys, our class was invited to participate in an international project. In this project, classes compete with each other for the title of the most advanced, the most well-coordinated, the most friendly, the most creative.

Everyone in our class is so different, can we cope? But if there is a chance, then you should always take it, and then you can achieve a lot. If we start participating in this project, then you, as a class, will have to go through 7 tests. Sooo different. It won't be eating frogs or racing elephants. Everything will be much more complicated)! These will be game tests. What they will be, I don't know yet. I know that these will be team

puzzles. Let's try to play a team puzzle. Just try our hand"

Procedure 1. Division into teams.

To play a TETRAK, it is necessary to divide the participants into 4 teams, using one of the division methods. For the introductory game, we recommend using the "Tree" division method. DON'T tell the guys that you are dividing them into teams, they will understand it in the process. "Who considers himself intelligent and can become the brain center of the team, raise your hand? (at this moment, cl.ruk selects 4 roots of the command). Now I ask each of you to choose your assistant (alternately choose your teammates from the remaining guys. Teammates approach the commanders).

Now I ask each chosen one to choose an assistant.

Thus, the chain is divided into teams.

In the end, there are a few guys who are either new or not using friendly popularity. The division of teams, of course, must be brought to an end, saying that teams with more people will have a clear advantage. The game is intellectual and communicative, the more people will offer solutions, the more chances there are to find the best option.

Procedure 2. Come up with a name, choose a commander.

The names are put on the board. As the game progresses, as the figures are revealed, it is necessary to put marks (+1 for each figure).

Procedure 3. Presentation of the rules of the game.

The teacher tells the general rules of the game and invites the commanders to pull out an envelope with figures. Answers all the players' questions about the rules of the game.

Procedure 4. Start and progress of the game. The first introductory batch

Has the goal been achieved (are all 12 figures open)? If achieved, how did it happen? Who was the initiator of the agreement? Restore briefly the chronicle of events in the game.

If not achieved, then why? Was there a need for cooperation among the teams, or was everyone playing a rivalry, and not an agreement? Was there an attempt to exchange information, build a common strategy?

Procedure 5. Start and progress of the game with a notebook. The second batch with the clarification of the rules

Before the game, participants are offered 5 minutes of free communication. During these 5 minutes, the teams are invited to develop a winning strategy, agree on interaction. The teacher should not sum up the results of this 5-minute agreement, you just need to interrupt communication at the end of time and offer further communication only through letters. Perhaps the guys will not have any suggestions about the strategy. This needs to be discussed after the end of the game.

The specified goal of the puzzle is necessarily announced: to reveal the entire field in the minimum number of moves.

Procedure 6. Discussion of the results of the game

Issues that need to be discussed.

- What was the goal of the game?
- Has the goal been achieved (are all 12 figures open)? If achieved, how did it happen? Who was the initiator of the agreement? Briefly restore the chronicle of events in games, the course of correspondence.
- Was it possible to spend less moves than done? How? - If not achieved, then what prevented it?
- How were the responsibilities distributed within the team? Was the person who writes the letters singled out separately? The one who chooses where to shoot? The one who shoots? Have responsibilities changed? Was it easy to come to an agreement within the team?

Procedure 7. Recording of pedagogical observations. Write down in free form your pedagogical observations during the game itself and during its discussion.

Appendix 16

Rules and procedures for the organizing and conducting the diagnostic game "RitmoGrad"

Procedure 1. Division into teams. The optimal number of people in a team is 5. If the number of players is not a multiple of five, then it is necessary that there are less than five people in some teams.

Procedure 2. Preparation for the game. Post or draw an empty calendar on the board. Prepare cards with information and tasks. For the convenience of the presenter, the cards are numbered. The minimum number of cards required to achieve the goal of the game is 20 (the first 20 cards). The remaining cards are added 5 at a time if there are more than 20 players. For example, if the players are from 21 to 25, then the first 25 cards participate in the game, and the players are divided into 5 teams. If the players are from 26 to 30, then 30 cards are involved in the game, divided into 6 teams. Team tasks are also numbered. They must also be used in the numbering order: for 20 people – the first 4 tasks, for 21-25 people – the first five tasks, for 26 or more – all six tasks.

Procedure 3. Telling the rules and legends of the game. Legend: "The international scientific laboratory "Rhythms of Life" conducts various studies on human biorhythms. In one of the experiments, people of different professions were offered to live for six months in a specially created unusual city. In this city, day and night, seasons were artificially changed, life proceeded according to its own calendar, which did not coincide with the usual one. This unusual artificial city was called RitmoGrad. This experiment was conducted quite a long time ago, and some information, unfortunately, has been lost. In particular, fragmentary information remained about the annual calendar of Rhythmograd. Will you be able to restore the residents' calendar based on this information?"

The goal of all players (class-squad): make a full annual calendar of the city's residents by entering the names of all five seasons and all ten months of the year in the correct sequence. In the calendar, time goes clockwise. Additionally, each team draws a card with its individual information task. According to the task, each team needs to have 5 cards with the specified information on hand by the end of the game

Each participant is provided with one information card. The text of this card cannot be shown to anyone, but you can tell and read out the information specified in it. Remark. If there are less than five people in the team, then someone gets two cards, the main thing is that each team has five cards in total.

Rules for filling out the calendar and using cards: 1. You can exchange cards. This is what will help you gather the information you need inside the team. You can exchange cards one by one. You cannot read the text of someone else's card until you have exchanged it. 2. You can approach the general annual calendar and write something in it only at the signal of the presenter. This happens once every three minutes. 3. Once every three minutes for exactly 30 seconds, the presenter announces the form of the general calendar available for entries. One person can write only one word in a shared calendar. 4. During the game, nothing can be written anywhere (except for the names of months and seasons in the main calendar form). Only the presenter has a writing subject, and he gives it out during the availability of the calendar to anyone. 5. If there are several applicants for a writing subject at the same time and they cannot agree among themselves who will be the first, the presenter does not give out the writing subject to anyone. 6. The team(s) wins, which by the end of the game has collected 5 cards necessary to fulfill its team task, provided that the entire annual calendar of Rhythmograd is filled in correctly.

Procedure 4. The course of the game. 1. The moderator distributes 5 cards to each team and gives a minute to familiarize each participant with his information and an oral exchange of information by teammates. 2. Then each team pulls out a card with a team task. Another 1 minute is provided to find out how many necessary cards are already in the team and how many need to be "extracted". 3. The presenter reminds that in addition to the team task, there is a common task for everyone – "drawing up the annual calendar of Rhythmograd". After that, he announces 5 minutes to develop a general class strategy. At this point, players cannot read aloud the text of their cards, but can only offer a plan of action. 4. Start of the active part of the game. From now on, players can freely move around the cabinet, exchanging information and cards. During the game, the presenter clearly monitors the time, announcing the availability of the calendar for entries every three minutes for 30 seconds. Duration of the game: 2040 minutes. If the players are not sufficiently prepared (if the players are poorly organized within the team), you can also announce 2 minutes for a meeting within the teams 10 minutes after the start of the game. The moderator announces the end of the game based on the intensity of the processes occurring during the game and the interest of the players. If in the course of the game it is clear that there are literally a couple of minutes left before the full compilation, it is worth giving this time to the guys. If the game is very sluggish, then you need to help, suggest a possible course of action, remind the rules. If you are organizing a tournament version of the game, you need to make no more than 6 bars for the players. Each clock cycle is 3 minutes of meetings + 30 seconds of recordings. During the game, it is also necessary to monitor the implementation of the rules for exchanging cards. You can introduce a penalty system if necessary, taking it into account when summing up the game.

Procedure 5. Summing up the game. 1. Each team first tells about their team task and the results of its achievement: whether they collected the five necessary cards, with whom they exchanged. 2. The presenter reminds that even if the team has collected its five cards, the victory can be credited to them, if only the general annual calendar of the city is compiled. There is a discussion of the chronology of the filling process. What were the disputes, how were the conclusions drawn, who owned the most valuable information to fill out the calendar. 3. The presenter demonstrates the correct option, a comparison takes place. 4. In the case of a tournament version, teams are awarded points: for a correctly compiled calendar 100 points; for each correctly completed task 10 points. Tasks are evaluated only if the calendar is correctly compiled. The winner is determined by the maximum number of points scored.
Key issues for discussion: - Was there a common strategy for performing a common squad (classroom) task? Which one? Is it successful? Who suggested it? What other strategies could there be: for each team individually, for the squad as a whole? - What were the strategies for performing team tasks? What other options could the team have? - What was the most difficult thing for each participant in this game?

Appendix 17

Assessment of the level of development of the ability to cooperate

Designed to assess the level of ability to cooperate in adolescents aged 11-15 years. This table is filled in by a teacher who watches the child in situations of joint activity and in the discussion of this joint activity.

Dear teacher, we ask you to evaluate the level of the child's ability to cooperate in 10 parameters. In each line, select (underline) the most appropriate, according to your observations, value of the corresponding parameter.

№	**Parameter**	**Level**		
1	Positive emotional attitude to situations of interaction with familiar people	present		absent
2	The expressed inclusion of a person in the process of cooperation	high	medium	Low
3	Responsible attitude to the result of joint actions	high	medium	Low
4	Readiness to describe and evaluate the behavior of partners in situations and circumstances of joint actions	high	medium	Low
5	Readiness for self-assessment in situations and circumstances of joint actions	high	medium	Low
6	Conscious replacement of unproductive activities with productive ones	present		absent
7	Willingness to comprehend the experience of cooperation	high	medium	Low

8	The level of involvement in all phases of cooperation	high (involvement in all 6 phases of cooperation)	medium (involvement in 4-5 phases)	Low(involvement in 3 phases and less
9	Consistency of agreements and actions	high	medium	Low
10	Readiness to build communication in situations of cooperation in unusual communication conditions	high	medium	Low

When filling out the table, the teacher has a sheet with a description of the phases of cooperation:
1. Coordination of motives.
1 Goal setting,
2 Orientation, distribution of roles, drawing up an action plan;
3 Execution;
4 Control of the results of joint activities;
5 Correction of the result and presentation of the result.

Processing and interpretation of the results.
For each selected "High" level, 2 points are awarded, for "Medium" 1 point, for "Low" 0 points. If the option "Present" is selected, 2 points are awarded, "Absent" 0 points.
All points are summed up.

The sum of points less than 3 is the level of the ability to cooperate "Zero" (zero).
The sum of points from 3 to 7 is the level of the ability to cooperate "Start" (low).
The sum of points 8-14 is the level of the ability to cooperate "Development" (average).
The sum of points is 14-20 the level of the ability to cooperate is "Skill" (high).

Appendix 18

Structured conversation with participants of online tournaments and meetings

At the beginning of the conversation, it is proposed to describe how the cooperation took place within the team. Independently describe some stages of cooperation. It is proposed to compare the selected stages with the following:

1. Coordination of motives.
1 Goal setting,
2 Orientation, distribution of roles, drawing up an action plan;
3 Execution;
4 Control of the results of joint activities;
5 Correction of the result and presentation of the result.

And then there is a discussion of each stage: who participated in each of the stages, how long each stage lasted, what was the result of each stage. What was done well at each stage, and what should be done differently next time.

Appendix 19

Calculation of correlation coefficient and effect size

1. Correlation coefficient

Comparison of the results of an experiment lasting one, two and four academic years.

X	**Y**	**X*X**	**Y*Y**	**X*Y**
Duration of gamification implementation (academic years)	The number of participants with a high and medium level of ability to cooperate(%)			
1	56	1	3136	56
2	82	4	6724	164
4	100	16	10000	400

$X_{average}$=(1+2+4)/3=2,(3)

$Y_{average}$= (56+82+100)/3=79,(3)

r=(1-2,(3))(56-79,(3)) + (2- 2,(3))(82-79,(3))+(4-2,(3))(100-79,(3))/ sqr((1-2,(3)^2+(2-2,(3)^2+(82-79,(3)^2+(4-2,(3)^2)*((56-79,(3)^2)+(82-79,(3)^2+(100-79,(3))^)2=

=63, 8888…./67,580404...=0,945

The correlation coefficient is equal to r=0.945. When the absolute value of the correlation coefficient is between 0.9 and 0.99, it is said that there is a very strong linear relationship between the values under consideration.

2. Effect size

Data of control classes-participants

Number of people in the class	Number of people with a high and medium level of ability to cooperate (people)	A number with a high and medium level of ability to cooperate (%) X
36	2	5,56
34	5	14,7
25	3	12
36	0	0
35	15	42,8
34	7	20,6
29	15	51,72
17	1	5,88
30	16	53,33
31	0	0

Xaverage=206,59:10=20,659

SD=sqr[((20,659-5,56)^2+(20,659-14,7)^2+(20,659-12)^2+(20,659-42,8)^2+(20,659-20,6)^2+(20,659-51,72)^2+(20,659-5,88)^2+(20,659-53,33)^2+2*20,659^2)/9]=20,904

d=[the value obtained during the study - control value]/SD

d=[59,0476-57,143]/20,9042=2,55

The size of the effect of the influence of the gamified program on increasing the individual level of the ability to cooperate to high and average in one academic year is d= 2.55 with a standard deviation SD = 20.904, calculated on a sample of 10 control classes (307 people). The effect size of more than 0.4 is a high indicator for school annual achievements, and more than 1 is significantly high, which is confirmed during the meta-analysis of J.Hetty's pedagogical research [241, pp. 22-24].