

# Children’s Academy of Inventions–Online Scientific- Educational Project of Children and Parents Cooperative Activity Development

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## ABSTRACT

This article considers new form of the development of the children creative capacity development process – the online scientific-educational project “Children’s Academy of Inventions”. The main principle of the educational network is to favour the transfer of demiurgeous activity traditions through the activities and events. The purpose of educational network designing: creation of an open educational space, developing creative capacities of the children’s and parents’ cooperative activities. Children’s Academy of Inventions is a society of scientists and teachers-practitioners, who implement the project of the children’s and parent’s invention development in cooperative activities. In order to exchange creative practices in the children’s and parents’ cooperative activity the public events, where the presentations of creative techniques with the elements of collaborative leaning “Big Creative Game”, “Islands of Creative Work”, “Conveyor of Inventions”, are held.

The main project implementation mean was the technology of creative work complex development – the associative and synectics technology (AS-technology) and digital options of its implementation. The integration of different types of creative work into the unique invention process with the initial stage of a written word, the best mean of which is the versification (or verse creation), is implemented for effective management of interaction of the creative work conscious and inconscient mental processes in AS-technology. Each stage of the technology implementation is ensured by computer assistance: a set of computer programs and services, which accelerate the user’s work at each technology stage. Herewith, the end product of the cooperative creative activity, organized with the use of computer assistance, is an invention: technical, organizational, social one. The use of AS-technology by the children in cooperation with the adults makes the children’s environment more friendly. The children acknowledge the possibility of their own positive influence on the changes of the outworld and find in it the support of the adults, important for them. The children’s work is organized with the help of a complex of computer-assisted programs. The multifold creative activity, organized with the help of AS-technology and relative computer assistance, gives the opportunity of creating long-lasting mixed-age creative communities, united by the socially significant objectives. In these communities the favourable conditions are created for designing of the own creative “Me” image by the children.

**Keywords:** *creative work associative and synectics technology, creative work computer assistance,*

*Children’s Academy of Inventions, online project*

## 1. INTRODUCTION

The creative work is a necessary component of any innovation process. Herewith, the creative work phenomenon nature, mechanisms still refer to the kind of half understood and mysterious thing for many people, and that’s why they are the objects of absolutely different directed philosophical, natural science and psychological-pedagogical studies and thoughts. The foundation of the systemized creative work studies was laid as early as

two thousand years ago by Pappus of Alexandria. In pedagogics, the special attention is paid to the studies, oriented to searching for the ways of the children’s and parents’ creative capability development, to the development and verification of different methods and forms of creative work development process organization, methodologies and technologies of its activation in pedagogical practice, the influence of age and gender particularities of the people, of their health particularities, are studied.

For a while now, the following statement has become common: it is required to aim for the increase of

the creative element part in the general and professional education process structure, in the interrelated processes of a growing human development, education and teaching (Foresight project: Russian Education – 2020: educational model for the economics, based on knowledge).

Herewith, it should be noted, that it is appropriate to improve the development of the rising generation creative work, the development of the learners creative capabilities in the conditions of educational system not only on the basis of economics and society abstract needs, but it is no less important to provide to each growing person the possibility of self-development in the creative educational environment in cooperation with other people of different ages, it is required to provide the conditions for a growing person, in which he would be able to create, project and construct the own “Me” image independently and with the improving part of consciousness. That’s why the technologies of creative capabilities development on the basis of interaction of all persons of the educational process: teachers, learners and their parents, which is under development, shall be oriented to the development of both children and adults, acting with them, creative work in the unity of three aspects:

- With the focus on the current level of capabilities development;
- With the focus on the learner’s independent choice of the possible creative work sphere and future professional activity;
- With the focus on prospective development of the best human qualities of the creative educational process performers (Novoselov, S.A.).

The complex development of children’s and parents’ creative capabilities development may favour it. It is important to note, that the interaction of the children, parents and teachers in cooperative creative activity –co-creation, is one of the most fruitful means of the children’s and parents’ creative capabilities complex development. The co-creation allows to achieve the synergetic effect of manifold reinforcement and qualitative transformation of the creative capabilities of all cooperative creative activity participants, all co-creation participants. This is the interaction, from which everybody gets the best. With the start of the epoch of all educational process digitalization, with the appeared opportunities of organization of online interaction at co-creation implementation, its efficiency increases even more.

## **2. PROBLEM STATEMENT**

Nowadays there’s no doubt, that the online interaction in whole and, particularly, the educational networks have high potential for the development of cross functional skills, including the soft-skills, which are a part of the society’s cultural and historical development, and which allow to broaden and strengthen the human’s potential with projection into the future.

According to the studies of Zhadko, N.V., Kuzminova, Ya.I., Sorokina, P.S., Frumina, I.D., Chudanovnaya, O.L. and others, the vast array of cross-functional skills

includes the broad group of characteristics of a human, being a personality and a subject of life’s activities, which ensure social adaptation, personal advancement, professional improvement. The researchers give different characteristics and lists of cross-functional skills, but in the most part of the works it is noted, that the success in society and the success of personal and professional development are determined by a human’s capability to the creative work, which is considered to be the process of activities on creation of new elements of physical and spiritual culture.

Along with that, the creative work development in the conditions of more and more strictly programmed educational environment with application of informational and communication means and artificial intelligence complicates an individual’s potential capacity release in the part of manifestation of his creativity and intuition, use of searching and combinatory techniques of thinking on the basis of emotional inclusion into the activities. In the contemporary educational system also remain fewer and fewer opportunities for growing generation engagement into the practical creative activities and development of capabilities of the elder generation to the creative work, because of their activity dissociation, caused by the field-specific functional objectives.

Along with that, by now there have been known the elaborations of Davydova, N.N., Tsurulnikova, A.M. and others on creation of education-oriented social networks, which have internal potential for their participants creative activities and may ensure not only the transfer of traditions, but also demiurgeous practice, experience exchange and dissemination, including the one with synergetic effect.

Consequently, emerges the problem of supplying of such educational network, which would include the crossings of intentions, objectives and social practices of the people of different generations for development of the creative work, being a specific activity process, leading to the development of a human’s value-based attitude to the demiurgeous process and to its result – a socially significant product, which has the novelty signs. And the specially organized environment of the creative work computer assistance may favour it.

## **3. STUDY ITEMS**

This article’s main issue is the study of the creative work in the context of searching for the forms, technologies, and computer, digital assistance of the creative work, allowing to release such individual’s capabilities, which support demiurgeous activity process and lead to the creation of a product, which has the signs of the objective novelty, and also to form the collaboration activity participants’ value-based attitude to both creative work process and its results in the social terms. Basing on the broadly set objective of the study, we distinguish the following key questions. How can we organize the educational network, so it would favour demiurgeous activity tradition transfer and development of creative

work of the people of different generations? What are the foundations and the contents of the technology, which supports the development of the creative work and creates the product, which has the signs of objective novelty in conditions of the educational network? And how can computer assistance favour it?

#### **4. STUDY OBJECTIVES**

The study objectives correlate with its main issue and allow to represent the detailed integrated elaboration for designing of the educational environment, being the educational network, ensuring development of the creative work of the people of different generations in collaborative activity:

- to work out a model of functioning of the educational network, ensuring the children's and parents' creative capability development in the collaborative activities with the prospective of computer assistance;
- to work out and describe the technology of the development of creative work of the people of different generations in collaborative activity and nominate the ways of this interaction computer assistance implementation.

#### **5. STUDY METHODS**

The combination of theoretical and empiric methods was applied in the course of the study execution, namely, the theoretical modelling, case-study and model experiment were used.

#### **6. RESULTS AND DISCUSSION**

6.1. The elaboration of the educational network functioning model, ensuring the children's and parents' creative capability development in collaborative activities was started with searching for theoretical foundations. We have studied the researches of national and foreign authors, related to the creative work development in whole and creative capability formation in different age periods (Andreev, V.I., Bogoiavlenskaya, D.B., Vygotsky, L.S., Guilford, J., Diachenko, O.M., Novoselov, S.A., Torrance, E.P., Rubinstein, S.L. and others), and to the issue of engaging children into the collaborative activities with the adults, including the creative ones (Gogoberidze, A.G., Umansky, L.I., Korotkova, N.A., Krotova, T.V., and others).

On the basis of the studied research materials we can affirm, that the objective of creative work development in all age periods is one of the top-priority ones, and the organization of collaborative activities is considered to be one of the most important means of creative work process support and passing, and of the achievement of the results, being a socially significant product (Andreev, V.I., Bogoiavlenskaya, D.B., Vygotsky, L.S.). Along with this, the analysis of theoretical concepts and empiric

material, reflected in different researches, shows, that the dynamics of creative work development in the society is connected to the application of social and cultural technologies, which designate the dynamics of creative activity practices exchange (Tsirulnikova, A.M.).

The specific mean of creative activity in the co-creation, which is deemed to be the correlation of an adult's creative process with a child's creative activity (Nikandrov, N.D.). The following cross-functional competences shall be deemed to be the most important co-creation achievements: personality decentration, initiative displaying, reasonable conflict resolution, based on friendliness in evaluation of a partner, and common activities result (Tsukerman, G.A.).

These provisions allow to phrase the main principle of the educational network elaboration: to favour the demiurgeous activity tradition transfer and the development of creative work of the people of different generations through all actions and events. The objective of the educational network designing: creation of an open educational space, developing the creative capabilities of the children and adults in collaborative activities, with the use of the Internet, which will allow to favour the demiurgeous activity tradition transfer and creative development of the people of different generations.

In order to achieve this objective, the scientific and educational project "Children's Academy of Inventions" was created in the academic year 2014/2015. The founders of Children's Academy of Inventions project considered it as the complex of interrelated scientific and research, scientific and methodical, and innovative educational events, implemented in conditions of time and resource limitations on the grounds of interaction of the university, small innovative enterprise, education management authorities, education organizations and parents.

Within the frames of this project, the objective, which had to be achieved, was the one of creating the open educational space, developing the children's creative capabilities, with the use of such organizational mechanisms, as: partner organization network; educational seminars for the teachers and the children; lessons, developing the co-creation of children, teachers and parents; public creative events. The main mean of the project implementation was the creative work complex development technology – the associative and synectics technology (AS-technology), and a set of computer programs, reinforcing it and used for the creative activity computer support and computer assistance organization.

This project developed into the Children's Academy of Inventions educational network, established in the year 2016, which was oriented to ensurance of the conditions, favouring the development of creative capabilities of the people of different generations on the grounds of integration of wide range of activity types and the synthesis of developing cultural practices in compliance with the contemporary educational standards and with accountance of the leading tendencies in

the scientific and technical sphere, including the digitalization of education.

Children's Academy of Inventions is a community of initiative scientists and teachers-practitioners, who implement the project of development of the children's and adults' creative capabilities and inventiveness in collaborative activities. The functioning of the Children's Academy of Inventions is built on application of the combination of social and cultural mechanisms, implemented with the use of the digital educational environment.

In order to manage the activities, the long-term and the short-term project designing is applied, the activity coordinators are determined, the website of the Children's Academy of Inventions is created in the Internet global network, through which the logistics of information for the Academy partners and potential participants of different events, and also for all concerned observers, interested in the creative work development issues, are ensured.

A scientific and methodological center, where the scientists and methodologists work, was established for the Academy's content creation and distribution. The scientific and methodological center performs the development of methodological assistance, which is deemed to be a set of structural components, required and sufficient for the educational activity designing and qualitative implementation in the part of creative work development. The most important component of such assistance is the authorial online course "Nobel Successors", placed on the website of the Children's Academy of Inventions, where all those who wish, may learn the unique associative and synectics technology, following which a patentable creative product may be created. One more methodological assistance component is the dual mean of project participant competence improvement in the part of mastering in the creative activities. The following hierarchically built forms of the creative activity practice exchange are applied: introductory seminars for individual education, horizontal education with the purpose of experience exchange (P2P), reflective meetings for setting the objectives of development in the immediate future.

In order to exchange the creative work practices in the children's and adults' collaborative activities, the mass events, where the public presentations of the creative techniques with the elements of the reciprocal learning, as for example, "Big Creative Game", "Islands of Creative Work", "Conveyor of Inventions" are organized, are widely applied.

In order to reveal the most top-tier creative works, a form of a children inventiveness festival is used, where the teams of different ages take part. The children, with the participation of the adults, create an invention in collaborative activity, which is presented to the wide audience and assessed by the competent jury, and in case of novelty revelation it is sent to patenting.

As of today, over 60 partners, transmitting the ideas and applying authorial mechanisms of the creative work development in the children's and adults' collaborative

activity, enter into the educational network of the Children's Academy of Inventions.

6.2. The working out and description of the inventiveness development technology of different generations in the collaborative activities;

The inherent creativeness of any child, the children's disposition toward the creative activities require from a teacher being on top of the responsibility in organizing the process of their creative capability development. The metapedagogical objective in the process of the learners' creativeness development process is the transformation of their creativeness and creative activities into the fruitful educative and creative activity, i.e. the actualization of their creativeness into the creative work, which prevents the children's unconscious coming to the way of generation of harmful things. This ultimate objective became one of the grounds of the associative-synectics technology (briefly – AS-technology), developed by Novoselov, S.A. – the technology of the children's and adults' creative capability complex development with the focus on the technical inventiveness. The fundamentals of this technology management algorithm are the system of specific principles:

- independent searching for new type situations and creative objectives through association of the mental models, created on the ground of personal experience, with the real situations, where a human comes across into difficulties at choosing behavior;
- combining well-known and new situations and objectives;
- synectical modelling of creative solutions;
- synthesis of the mental activity logical and emotional-imaginative types;
- controlled inclusion of the mechanisms of conscious and inconscient information interaction;
- synthesis of research (cognitive), creative, and project activity types;
- creative work objectification.

These principles implementation is oriented to the integration of multifold information association mechanism, being formed in the thoughts in the process of teaching associative heuristic methods, and the mechanisms of transferring of the skills of synectical analogies in the creative work, to the combination of two relatively independent information circuits. One of them is the circuit of conscious information, built in compliance with the logics regulations, and assembled from the fragments, elements of the information on the object, being under study, invention. Another one is the circuit, formed by brain in the sphere of inconscience, which consists of the information fragments, acquired in course of the life activities, uncontrolled by the conscious. Their unification into the double circuit, or into the double informational spire, similarly to the DNA, creates the new conscious information, i.e. the creative achievements, openings and inventions.

For the purposes of effective management of the conscious and inconscient psychical process interaction, the mechanism of the conscious and inconscient

information “mutual conjunction” in the course of creative work, developed by AS-technology, provides the organization of co-creative activities, oriented to the integration (synthesis) of different types of the creative work in one inventional process with the leading role of the written word, the best mean of which is the versification (or, which is even more technological, of verse creation). Herewith, an end-product of the co-creative activity is an invention: technical, organizational, social or another one, i.e., broadly speaking, an invention is some physical object or an object, influencing on the physical environment, which is characterized by the novelty (within the range of the world novelty), fruitfulness for the human society and reproducibility.

It is also necessary to note, that an invention is a final product of the children’s and adults’ co-creation, but not the unique one. The AS-technology presupposes creation of a complex creative product. It determines the algorithm of technology functioning, consequence of the creative activities and operations, executed by the children and adults.

The children’s and adults’ creative activities are organized according to the following algorithm:

- 1) The participants are suggested to choose any children literary work, known by them: one or several poems of children poets, one or several fairy tales or children stories, or several proverbs or sayings.
- 2) By analogy with the plot (plots) of the chosen works, the children are offered to compose their own (individual or collective) literary work. Herewith, the operations of the literary work fragments combining is used, but it’s used under condition that in the result new plots, new images and new situations, in which the characters of composed works get, appear. At this stage, the co-creation of the children with the teachers and parents is desirable. In particular, the work on writing down of the ideas, images and plots of the works, being composed, suggested by the children, is completely executed by the adults.
- 3) The children are suggested to draw the protagonists and other objects of the plots of composed literary works. Herewith, the teachers and parents suggest and help children to make the drawings with the help of algorithmic drawing method. The children in collaboration with the adults execute original graphical and pictorial composition from the received algorithmic drawings. Comics drawing is also available.
- 4) Reading over the composed literacy works together with the children and looking at the drawings and compositions, made by the children, the teachers and the parents help children to see, describe, analyze the problem situations, in which the protagonists of their compositions get or may get.
- 5) The children are suggested to eliminate the revealed problem with the help of creating new devices and means, new machines and mechanisms, new substances and labour, game, and household items. This creation, which is, in fact, the children’s inventive activity, is organized

with the help of application of one of the creative work associative methods, for example, with the help of the focal object method.

6) The created technical invention (device, mean, mechanism, etc.) is drawn, and the participants try to find a place for it on previously made compositions.

7) While analyzing, discussing with the children the received visual compositions with the technical inventions, included into them, the children are suggested to write some more to the literary works, composed earlier, in such way, that the technical devices or game, labour, household items, invented by them, would allow to reinforce the work’s positive sense.

8) According to the composed literacy work and drawn compositions, the children are suggested to make applied ornaments, to model the protagonists and objects, surrounding them, of clay or modelling clay, to make the created technical inventions from paper, cardboard and other available materials, and also from the construction set details. As an option, the toys, related to the plot of the literacy work, composed by the children, can be made. Herewith, all known techniques and technologies may be used.

9) The Children’s Academy of Inventions project network partners, the employees of a small innovative enterprise, Design and Innovation Institute, LLC, conduct the analysis of inventions, created in co-creation of the children, teachers and parents, oriented to the subject of possible patent protection of the inventions or utility models. If the analysis process shows the doubtfulness of the legal protection of the products of children’s and parents’ co-creation, then the network partners conduct the analysis of created creative products in order to search for the ways of their improvement and supplementation. And together with the teachers and the parents, they take decision on the collaborative patenting of the supplemented invention, herewith, all co-creation process participants enter into the authors team. This step has large educational meaning and implements the function of the child’s prospective motivation to the continuation of the independent inventive activity when he/she reaches the age of profession selection and professional becoming.

The developed technology of the complex development of the children’s and parents’ creative capabilities development – AS-technology, has passed multiple verification at the children invention festivals. Its algorithm is partially implemented with the use of the child, teacher, and parent co-creation computer assistance programs. As of today, five Russian Federation patents on the utility models and inventions, made with the use of the developed technology, have been received, 2 invention applications are under consideration of the experts of the Federal Institute of Industrial Property and 12 more children-adult inventions are in process of primary expert determination, executed by the specialists of the small innovative enterprise.

## 7. CONCLUSION

The Children's Academy of Inventions is a successfully developing online scientific and educational project of the children's and adults' co-creation improvement with high potential of the further growth on the basis of its digitalization. The project implementation is executed at the innovation sites of the Ural State Pedagogical University – in the best preschool educational organizations and schools of Yekaterinburg and Sverdlovsk region. Thanks to this project, the scientific and methodological assistance of the creative capability complex development has been organized for over 2000 educatees of preschool educational organizations and schools' pupils. Hundreds of parents are involved into the co-creation activities. The website of the Children's Academy of Inventions has been created and is in the process of improvement. This online scientific and educational project's near-term outlook is its coming out of the borders of Sverdlovsk region, development of the research and natural science component in its structure, and creation of the education institution network, using in their educational environment the inventions, created in the result of co-creation of the children, studying in these institutions, their parents and teachers.

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As of today, the technology of the children's and parents' creative capability complex development – AS-technology, is the only technology of its kind, oriented to revelation of children's disposition to different spheres of creative activities and, simultaneously, it is the technology of forming of vast array of creative competences with the accent on technical inventiveness. When it is used by children in co-creation with the adults, it makes the children's surrounding environment more clear and friendly. The children recognize the opportunity of the own positive influence on the changes in the world around, and find in it the support of the adults, important for them. The multifold creative activity, organized with the help of AS-technology, gives the opportunity of development of long-term mixed-age creative communities of the children and adults, united by socially significant objectives. The digitalization, computer assistance of the children's and parents' creative work reinforces the effect of creation of the favourable conditions for the children's designing of the own creative "Me" image.

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