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**Kognitonika**

**Cognitonics**

Urednika • Editors:

Vladimir A. Fomichov, Olga S. Fomichova

Ljubljana, Slovenija  
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# PREDGOVOR MULTIKONFERENCI INFORMACIJSKA DRUŽBA 2022

Petindvajseta multikonferenca *Informacijska družba* je preživela probleme zaradi korone. Zahvala za skoraj normalno delovanje konference gre predvsem tistim predsednikom konferenc, ki so kljub prvi pandemiji modernega sveta pogumno obdržali visok strokovni nivo.

Pandemija v letih 2020 do danes skoraj v ničemer ni omejila neverjetne rasti IKTja, informacijske družbe, umetne inteligence in znanosti nasploh, ampak nasprotno – rast znanja, računalništva in umetne inteligence se nadaljuje z že kar običajno nesluteno hitrostjo. Po drugi strani se nadaljuje razpadanje družbenih vrednot ter tragična vojna v Ukrajini, ki lahko pljuske v Evropo. Se pa zavedanje večine ljudi, da je potrebno podpreti stroko, krepi. Konec koncev je v 2022 v veljavo stopil not raziskovalni zakon, ki bo izboljšal razmere, predvsem leto za letom povečeval sredstva za znanost.

Letos smo v multikonferenco povezali enajst odličnih neodvisnih konferenc, med njimi »Legende računalništva«, s katero postavljamo nov mehanizem promocije informacijske družbe. IS 2022 zajema okoli 200 predstavitev, povzetkov in referatov v okviru samostojnih konferenc in delavnic ter 400 obiskovalcev. Prireditve so spremljale okrogle mize in razprave ter posebni dogodki, kot je svečana podelitev nagrad. Izbrani prispevki bodo izšli tudi v posebni številki revije *Informatica* (<http://www.informatica.si/>), ki se ponaša s 46-letno tradicijo odlične znanstvene revije. Multikonferenco *Informacijska družba 2022* sestavljajo naslednje samostojne konference:

- Slovenska konferenca o umetni inteligenci
- Izkopavanje znanja in podatkovna skladišča
- Demografske in družinske analize
- Kognitivna znanost
- Kognitonika
- Legende računalništva
- Vseprisotne zdravstvene storitve in pametni senzorji
- Mednarodna konferenca o prenosu tehnologij
- Vzgoja in izobraževanje v informacijski družbi
- Študentska konferenca o računalniškem raziskovanju
- Matcos 2022

Soorganizatorji in podporniki konference so različne raziskovalne institucije in združenja, med njimi ACM Slovenija, SLAIS, DKZ in druga slovenska nacionalna akademija, Inženirska akademija Slovenije (IAS). V imenu organizatorjev konference se zahvaljujemo združenjem in institucijam, še posebej pa udeležencem za njihove dragocene prispevke in priložnost, da z nami delijo svoje izkušnje o informacijski družbi. Zahvaljujemo se tudi recenzentom za njihovo pomoč pri recenziranju.

S podelitvijo nagrad, še posebej z nagrado Michie-Turing, se avtonomna stroka s področja opredeli do najbolj izstopajočih dosežkov. Nagrado Michie-Turing za izjemen življenjski prispevek k razvoju in promociji informacijske družbe je prejel prof. dr. Jadran Lenarčič. Priznanje za dosežek leta pripada ekipi NIJZ za portal zVEM. »Informacijsko limono« za najmanj primerno informacijsko potezo je prejela cenzura na socialnih omrežjih, »informacijsko jagodo« kot najboljšo potezo pa nova elektronska osebna izkaznica. Čestitke nagrajencem!

Mojca Ciglarič, predsednik programskega odbora  
Matjaž Gams, predsednik organizacijskega odbora

# FOREWORD - INFORMATION SOCIETY 2022

The 25<sup>th</sup> *Information Society Multiconference* (<http://is.ijs.si>) survived the COVID-19 problems. The multiconference survived due to the conference chairs who bravely decided to continue with their conferences despite the first pandemics in the modern era.

The COVID-19 pandemic from 2020 till now did not decrease the growth of ICT, information society, artificial intelligence and science overall, quite on the contrary – the progress of computers, knowledge and artificial intelligence continued with the fascinating growth rate. However, the downfall of societal norms and progress seems to slowly but surely continue along with the tragical war in Ukraine. On the other hand, the awareness of the majority, that science and development are the only perspective for prosperous future, substantially grows. In 2020, a new law regulating Slovenian research was accepted promoting increase of funding year by year.

The Multiconference is running parallel sessions with 200 presentations of scientific papers at twelve conferences, many round tables, workshops and award ceremonies, and 400 attendees. Among the conferences, “Legends of computing” introduce the “Hall of fame” concept for computer science and informatics. Selected papers will be published in the *Informatica* journal with its 46-years tradition of excellent research publishing.

The Information Society 2022 Multiconference consists of the following conferences:

- Slovenian Conference on Artificial Intelligence
- Data Mining and Data Warehouses
- Cognitive Science
- Demographic and family analyses
- Cognitronics
- Legends of computing
- Pervasive health and smart sensing
- International technology transfer conference
- Education in information society
- Student computer science research conference 2022
- Matcos 2022

The multiconference is co-organized and supported by several major research institutions and societies, among them ACM Slovenia, i.e. the Slovenian chapter of the ACM, SLAIS, DKZ and the second national academy, the Slovenian Engineering Academy. In the name of the conference organizers, we thank all the societies and institutions, and particularly all the participants for their valuable contribution and their interest in this event, and the reviewers for their thorough reviews.

The award for life-long outstanding contributions is presented in memory of Donald Michie and Alan Turing. The Michie-Turing award was given to Prof. Dr. Jadran Lenarčič for his life-long outstanding contribution to the development and promotion of information society in our country. In addition, the yearly recognition for current achievements was awarded to NIJZ for the zVEM platform. The information lemon goes to the censorship on social networks. The information strawberry as the best information service last year went to the electronic identity card. Congratulations!

Mojca Ciglarič, Programme Committee Chair

Matjaž Gams, Organizing Committee Chair

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## **FOREWORD / PREDGOVOR**

### **Seventh International Conference on Cognitonics - the Science about the Human Being in the Digital World (Cognit-2022)**

Since October 2009, the international scientific conference on Cognitonics (“Kognitonika” in Slovenian) is a part of the international scientific multiconference INFORMATION SOCIETY (Slovenia, Ljubljana, Jozef Stefan Institute).

In the Preface to the Proceedings of the Sixth international conference Cognit-2019, we formulated the following expanded definition of Cognitonics: *it is the science about the trajectories of raising the human being to such level of intellectual and spiritual height where the scale of his/her personality becomes proportional to the scale of the digital world.*

The first objective of Cognitonics, or the Science about the Human Being in the Digital World, is to explicate the distortions in the perception of the world caused by the information society and globalization. The second, principal objective of Cognitonics is to cope with these distortions in different fields by means of elaborating systemic solutions for compensating the negative implications of the kind for the personality and society, in particular, for creating cognitive-cultural preconditions of the harmonic development of the personality in the information society and knowledge society and for ensuring the successful development of national cultures and national languages.

The goal of the conference is to combine the efforts of the scholars from numerous scientific fields and educators in order to establish a new synergy aimed at ensuring the harmonic, well-balanced development of the personality, national cultures, and national languages in the forming knowledge society (smart society) and, as a consequence, to compensate a number of broadly observed negative distortions.

From the standpoint of educational practice, Cognitonics suggests an answer to the following question: what precious ideas and images accumulated by the mankind, at what age, and in what a way are to be inscribed into the world's conceptual picture of a person in order to harmonize his/her intellectual and spiritually-coloured emotional development and to contribute to the successful development of national cultures and national languages?

Cognitonics formulates a new, large-scale goal for the software industry and Web science: to develop a new generation of culture-oriented computer programs and online courses (in the collaboration with educators, linguists, art historians, psychologists) - the computer programs and online courses intended for supporting and developing positively-oriented creativity, cognitive-emotional sphere, the appreciation of the roots of the national cultures, the awareness of the integrity of the cultural space in the information and smart society (knowledge society), and for supporting and developing symbolic information processing and linguistic skills, associative and reasoning abilities of children and university students.

Being a relatively young scientific discipline, Cognitonics both is of high social significance just now and has great prospects of the kind. It is due to the fact that it suggests new, deep and constructive ideas, new angles of look and original, effective solutions to a number of socially

significant problems emerged in adjacent fields, including education. The examples of such solutions are as follows.

During last decade, big international companies, fulfilling the casting of the specialists for vacant positions, have been paying a high attention to the level of emotional intelligence (EI) of the pretenders. Cognitonics suggested a highly effective system of teaching methods aimed at supporting and developing EI of the learners. This system includes, in particular, a many-staged method of early children's socialization in information and knowledge society and a method of developing creativity, figurative thinking, the skill of integrating information from numerous dispersed sources. Cognitonics enriched psychology by means of introducing the notion of Thought-Producing Self and of suggesting the most deep today (on the world level) model of developing conscious control in the childhood: control of thought, emotions, and actions.

Art cognitonics - one of the most developed branches of cognitonics - makes a considerable contribution to cultural studies and theory of up-bringing. It develops a complex method of using the works of art for positive development of the child's, adolescent's, and university student's personality. Art cognitonics suggests a new paradigm of delivering lectures on art.

Cognitonics is a quickly developing scientific discipline being ready to answer the emerging challenges of time. A new example is given by one of our papers below. It introduces the *Method of Cognitive Painting* as an effective tool for constructing a positive cognitive-emotional space for children and adolescents under conditions of the COVID-19 pandemic.

The Programme Committee accepted for the conference 6 papers from 5 countries: Croatia, Italy, Japan, Russia, Slovenia.

The editors would like to thank the authors of the papers for their contributions and the members of the Program Committee for their precious comments ensuring the high quality of the accepted papers and making the reading as well the editing of this volume a rewarding activity.

#### **Editors and Programme Presidents / Urednika**

- Vladimir A. Fomichov
- Olga S. Fomichova

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# Theoretical Foundations and Experience of Six All-Russian Creative Web-based School-contests “Portrait of Your Town”

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## ABSTRACT

The paper sets forth the theoretical foundations and experience of six All-Russian creative school-contests (the years 2017 – 2022) “Portrait of your town” for children and adolescents at the age from 7 to 18 years. The methodological basis of this school-contest is the ideas of cognitronics, or the science about the human being in the digital world. This school-contest emerged as a civic initiative of this paper’s authors. The winners of the school-contest are awarded by a Letter of Gratitude signed by a senator of Russian Federation (RF) in accordance with a subject of RF. The number of the school-contest winners in 2022 is 518. A special attention in the paper is given to the tracks “Say thank you” and “World, nature, universe’s essence (Nature oriented behavior)”. In the year 2022, the school children from 58 subjects of RF (68% of all RF subjects) participated with the essays in this school-contest. It is concluded that every-year school-contest “Portrait of your town” can be interpreted as the third implementation of the student-self oriented learning model introduced by the authors several years ago and as smart learning environment of a new kind.

## KEYWORDS

Creative school-contest, cognitronics, art cognitronics, smart learning environment, student-self oriented learning model, nature oriented behavior, creativity development, soft skills, transversal skills, personality development, system of emotional-imaginative teaching

## 1 INTRODUCTION

One of the significant social problems in modern Russia is as follows. The most gifted and highly motivated students of high schools enter the leading universities in biggest cities of the country (mainly, in Moscow and Saint-Petersburg), receive an excellent education and never return to their native towns and villages. A part of them finds jobs in abroad. As a consequence, the population of middle and small towns has been diminishing.

In the beginning of 2017, we launched an All-Russian Web-based creative school-contest for school children "Portrait of your town"; it took place for the sixth time in January - June 2022.

It is a delicate opportunity for the child at the age from 7 to 18 years to tell about the beauty and peculiarity of her/his town being for the child the place of living, to feel the own roots, to perceive herself/himself as a link in the chain of generations, to have a sophisticated look at her/his world and find her/his personal look at the outstanding or usually not noticed facets of her/his town - such facets without which, according to her/his opinion, the complete portrait of the country can't be formed. The technical support (Web-platform) was provided to our school-contest by the Association of Living Cities, supported by the Public Chamber of the Russian Parliament.

The most bright, beautiful thoughts from the compositions of the winners of the school-contests 2017 - 2022 were presented at the first and second exhibitions "Country as an Orchestra" and the third and fourth exhibitions “Portrait of the country depicted by children with all their heart” in the Federation Council of Russian Federation (RF) - the upper chamber of the RF Parliament (“it is called "State Douma"). The authors of the essays presented (partially) at the first – fourth exhibitions were awarded by a Letter of Gratitude signed by a senator (a member of the RF Federation Council) in accordance with a region.

In the beginning of 2019, the new tracks "Say thank you" and “World, nature, universe’s essence” (it is a line from the poem “When it clears up” by Boris Pasternak) were included into the school-contest "Portrait of your town". The diapason of ages was considerably expanded: it is from 7 years to 18 years. The participants are to realize what persons from their native towns have made a difference in their life, who have influenced them a lot in their choice of future occupation, who has given the model of behavior children would like to emulate.

The participants of the track "Say thank you" submit the essays explicating their feeling of gratitude to the persons of the kind. Our first working hypothesis was that this track will be able to considerably contribute to developing in young people the sense of belonging to the native town. Then, after receiving an academic degree in a university, a part of young specialists will return to their native region or will regularly do something useful for their region.

The school-contest "Portrait of your town" has a methodical provision in the form of five written lectures posted on the Web. These lectures are prepared by the second author of this paper

and are oriented at the adult specialists (from a school or a library) helping children to prepare the sketches for the school-contest. This interaction with an adult helps children and adolescents a lot to better explicate their feelings.

Since the year 2017, we have found and successfully implemented two original ways of using modern information and communication technologies for developing a broad spectrum of soft skills in children and adolescents.

During last decade it has been broadly realized that education in knowledge society (or smart society) is to pay a particular attention to supporting and developing in the learners the significant, domain independent skills called soft skills [2, 30] or transversal skills [1, 31], first of all, analytical and critical thinking, creativity, out of box thinking, thinking and acting in terms of public good. The significance of creativity perceived by the world leading experts has been quickly increasing. The experts of the World Economic Forum (WEF) in Davos, Switzerland published in [25] the list of top 10 skills for the year 2015 and a forecast of the similar list for the year 2010. It is sufficient to say that the position of creativity shifted from the position No. 10 in 2015 to the position No. 3 in 2020. The forecast of the WEF list – 2020 includes also new skills in comparison with the WEF list 2015: emotional intelligence (the position No. 6) and cognitive flexibility (the position No. 10).

Our second working hypothesis was that the school-contest "Portrait of your town" and, in particular, the track "Say thank you" will contribute not only to developing the sense of belonging but also to supporting and developing a number of significant soft skills.

The analysis of the submitted best essays shows that the school-contest supports and improves emotional intelligence of the participants and develops such significant transversals (or soft skills) as analytical thinking, critical thinking, figurative thinking, creativity, out of box thinking, the ability to think and act in terms of public good. The first track "Say thank you" (February - June 2019) attracted the participants from 18 subjects of Russian Federation, including the subjects in Siberia, North and South of the country.

The next sections describe the scientific background and educational objectives of this school-contest.

The significant benefits for the personality development of children and adolescents – the participants of the All-Russian creative school-contest "Portrait of your town" have caused a quick growth of the school-contest's popularity. The figure 1 shows the dynamics of the number of Russian Federation subjects participating in the school-contest during the years 2017-2022. It should be underlined that the growth of this number during the year 2022 reached 50%.

The result of the step-by-step evolution of the All-Russian creative school-contest "Portrait of your town" during six year is as follows. Now it is a unique education and up-bringing oriented platform realizing a dialogue between the bright, deeply feeling children and adolescents from even remote regions and the representatives of the state. The forms of the feedbacks received by children and participants are the comments of the teachers, the comments in analytical every-year reports prepared by the scientific advisors of the school-contest (the volume of each annual report is from two to four hundred pages), the comments in the mass media, and the words pronounced by the senators of

Russian Federation during a festive reception in a region capital organized for the winners of the school-contest.

It is important that the school-contest contributes to coming back to the society of the perception of a bright, beautiful (but non-commercial) thought as a value.

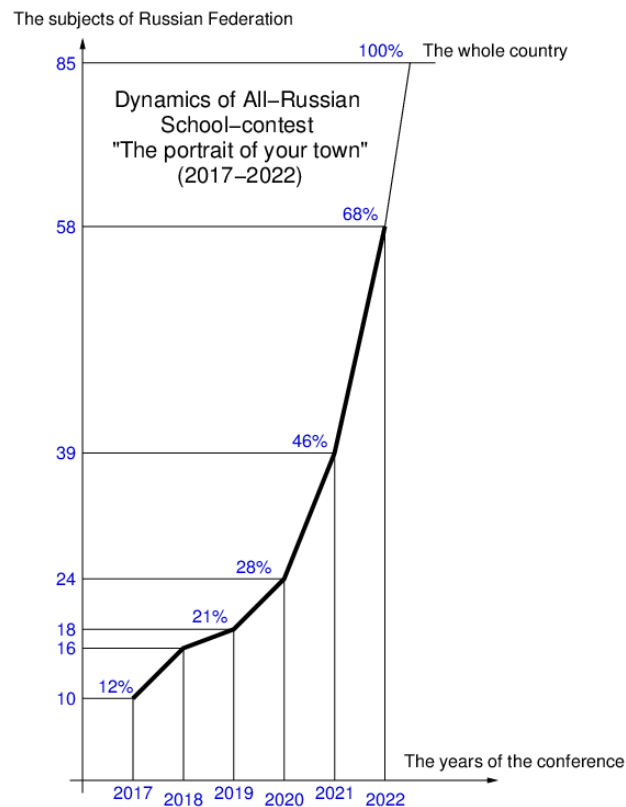


Figure 1: Dynamics of school – contest (2017 – 2022)

## 2 GENERAL INFORMATION ABOUT THE ALL-RUSSIAN CREATIVE SCHOOL-CONTEST "PORTRAIT OF YOUR TOWN" AND ITS TRACK "SAY THANK YOU"

The school-contest "Portrait of your town" has a methodical provision in the form of five written lectures posted on the Web. These lectures are prepared by the second author of this paper and are oriented at the adult specialists (from a school or a library) helping children to prepare the essays for the school-contest. This interaction with an adult helps children and adolescents a lot to better explicate their feeling.

The statistical results of the third school-contest "Portrait of your town" (January – June 2019) are as follows: the participants were from 18 subjects of Russian Federation, they lived in 39 places, including 27 towns and 12 settlements in country side. 240 sketches became the winners of the school-contest, including 72 sketches from the new track "Say thank you".

In the year 2022, the school children from 58 subjects of RF (68% of all RF subjects) participated with the essays in this school-contest. 518 participants received a letter of Gratitude from a senator of RF (in accordance with a region).

The fourth exhibition “Portrait of the country depicted by children with all their heart” in the Federation Council of the RF Parliament (June 2022) consisted of 56 pictures containing the fragments with the brightest ideas from the essays of the winners.

The analysis of the essays submitted to the track “Say thank you” enabled us to construct an unexpectedly rich classification of the persons receiving “Thank you” from the participants. This classification is as follows: 17% - friend; 15% - school teacher; 12% - mother; 10% - teacher of extra education; 10% - inspiring person; 7% - father; 7% - relatives; 7% - manager; 5% - grandmothers and grandfathers; 5% - unknown person; 3% - tutor; 2% - school employee. The constructed classification was used as a system of nominations.

Let’s consider several examples of home compositions.

**Example 1** (analytical thinking). The 8 year old girl Kate writes: “One autumn day the parents led me to a ballet school. Yana K. became my teacher. She seemed to me being just, kind, and beautiful. She is teaching us good but rigorously. She wants everything to be OK in our life and that is why we are to undertake efforts. I’ve realized that it is necessary to make much efforts for achieving a result. I’ve realized that if one undertakes much efforts and works very much then the world and the people in this world will become better.

Thank you, my teacher, for evoking in me the belief that I will be able to cope with everything, and it means that I’ll be able to do everything”.

**Example 2** (empathy, mindfulness). A 11 years old girl Maria writes: “One spring day a young man opened a door of his car, intending to drive away. Suddenly he noticed a young girl who was crying, because her cat was unable to climb down to her from the top of a high tree. The young man reached the top of the tree, grasped the cat, and returned back with the cat. The young girl was happy”.

**Example 3** (empathy, thinking and acting in terms of public good). A 8 years old boy Andrey writes: “I would like to say THANK YOU VERY MUCH to my teacher Maria K. She is a very kind person and a person of ready sympathy. One autumn day we with my class had an excursion in Kremlin. It was November, and it was cold. I lost my hat in school. At the moment when all the classmates were dressed and were waiting for me, I was looking for my hat, but all my efforts failed. Then my classmates started to help me to find my hat, but we failed to do it. Then our teacher gave me her hat and went on excursion without hat. Everything was good, we successfully went on excursion, and nobody from us became ill”.

### **3 REALIZATION OF A NEW FUNDAMENTAL APPROACH TO UPBRINGING**

Since the year 2019, the school-contest “Portrait of your town” includes the track “World, Nature, Universe’s Essence”. The rationale for introducing this track is as follows.

The broad prospects of developing the personality of children and adolescents not understood, not used by modern education as a whole are opened by systematic, starting in early childhood, establishment of a correspondence between the situations observed in the nature and everyday situations.

Today the children throughout the world study the nature from the standpoints of botanic, biology, geography, chemistry, and physics. Our accumulated experience shows that this approach is too narrow, it is not assuming a philosophy of understanding the nature, of grasping the whole spectrum of knowledge about the world and about the behavior of a person in the world of people, this philosophy is encoded in the phenomena of nature.

Outstanding poets, writers, and painters give numerous examples of decoding deep meanings of nature’s phenomena, the examples of expressing these deep meanings by means of verbal and visual images being comprehensible for the human beings. We are convinced that it is possible and necessary to use the lessons of literature, poetry, and the arts as the possibilities of a dialogue between the person and the nature, while searching for the answers to acute questions during the period of personality’s maturing.

The habit to conduct a dialogue of the kind creates cognitive preconditions of forming a principally new level of ecological consciousness when the nature becomes your permanent dialogue partner which is able to listen to you and to give the answers. This is the true meaning of the broadly known phrase “It is necessary to be able to read the book of nature”.

The most important result of forming this new level of ecological consciousness is the creation of strong inner restrictions concerning the destroying impact of the human being on the nature: you can’t destroy something that is in your consciousness a life prompter and assistant.

Analyzing the essays submitted to the considered nomination in the years 2019 - 2022, we concluded that the idea of nature-oriented behavior was broadly perceived by young children and teenagers and became a part of their conceptual world’s picture.

**Example 1** (the girl Alexandra E.). “Let’s consider the emergence of the leaves on the trees in spring and the shedding of leaves in autumn. I selected this phenomenon, because it is similar to the situation as people emerge in our life: some time they are close to you and then, in autumn, their interest in you fades, your relations are fading, and such people lose the connection with you, just as the leaves during the shedding. Only those people stay near you, who interlock with the tree and are fading together with it”.

**Example 2** (the boy Ilya K.). “A leaf from a tree fell in the water of a river, the river grasped it and carried away. May be, it will stop on the beach of the river, but, may be, it will put on weight and sank. The same situation can be observed in the life. If a person has no own opinion, he/she will “flow” across the life, achieving nothing. It is necessary to have the own opinion”.

Taking the above said into account, we suggest a new fundamental approach to upbringing of young children and adolescents (considering up-bringing as directed socialization): to systematically establish the parallels between the phenomenon of nature and social agreements, life situations.

#### 4 THE SCHOOL-CONTEST “PORTRAIT OF YOUR TOWN” AS THE THIRD IMPLEMENTATION OF THE STUDENT-SELF ORIENTED LEARNING MODEL

It is possible to indicate an interesting interpretation of the school-contest “Portrait of your town” in the context of the achievements of modern education theory. During last decade, the peculiarities of knowledge society have created the need for a new paradigm of educational process. One of the most significant peculiarities of the kind is the necessity to change a profession several times during the working period of life.

Proceeding from broadly accepted role of emotional intelligence (EI) in professional and personal life, we suggested a new learning model (LM) called Student-Self Oriented LM (SSOL-model). It is defined as the model being beneficial for self-cognition and self-construction through the prism of the acquired knowledge and life experience [15-17, 24].

The scientific literature describes two successful implementations of the SSOL-model. The first one is the *System of Emotional-Imaginative Teaching (the EIT-system)*, based on the *Theory of Dynamic Conceptual Mappings (the DCM-theory)*. The EIT-system is aimed at systematic development of EI, reasoning skills, sound creativity, figurative thinking, language skills, and communication culture at the lessons of language - mother tongue and SL, literature and poetry in two languages (on the example of Russian and English), symbolic languages of painting, sculpture, garden-park art, classic dance. We have accumulated the 32-year-long successful experience of using the EIT-system in extra education in Moscow, Russia. Many aspects of the DCM-theory and the EIT-system are described, in particular, in [4 – 17, 19 – 24].

The DCM-theory and the EIT-system belong to the constructive core of *cognitonics, or the science about the human being in the digital world* [11 – 24]. We organized as the co-chairs seven international conferences on cognitonics in conjunction with the international scientific multiconferences “Information Society” (Slovenia, Ljubljana, Jozef Stefan Institute, October 2009, 2011, 2013, 2015, 2017, 2019, 2022, see [https://is.ijs.si/?page\\_id=903](https://is.ijs.si/?page_id=903)). Totally, the researchers from 24 counties participated with the papers in seven international conferences on cognitonics.

The ideas and methods of cognitonics underpinned a number of educational projects in several countries, in particular, in Croatia and Macedonia [29], Croatia [28], United Kingdom [26, 27], and Mexico, United Kingdom and PR China [3].

In [16, 18, 24], we formulated the following expanded definition of cognitonics: *it is the science about the trajectories of raising the human being to such level of intellectual and spiritual height where the scale of his/her personality becomes proportional to the scale of the digital world.*

The second successful implementation of the SSOL-model is *Art Cognitonics (AC)* [14 – 17, 24]. AC is one of the principal branches of cognitonics. AC aims at tuning the EI of the young children and adolescents with the help of well-known works of art. The goal is to create a bright semantic trace in the world’s conceptual picture of the learner corresponding to an idea explaining or illustrating a moral value, communicative situation, a situation of making a decision, cognitive process itself, the process of self-cognition and consideration, the seething cocktail of emotions, a way of viewing the world around, etc.

AC establishes the links between the objects, situation, processes, views of a person (a beholder) and the work of art that becomes a metaphor or a vivid illustration (vivid mental representation) of something the beholder is considering about. That is why the consciousness of the beholder receives a considerable impulse to developing the ability of establishing diverse analogies and consequently to finding a new look at a situation.

**Example.** For enriching the colour of their canvases, the impressionists made use of what is known as division of colour and optical blending. E.g., to represent a green meadow, they put little tabs of blue and yellow on the canvas which are supposed to be combined to form green in the eye of the beholder – a far more intense green than one taken straight from the artist’s palette. That is why it is impossible to understand the idea of a picture standing close to the canvas. We have to step aside and look at it from a certain distance to enjoy it and to have the desired effect.

The same situation we have in every-day life. “Multiple debts, reflections” prevent us from grasping the sense of what is happening. As in case with impressionists’ canvases, we have to have a look at the situation from a distance, and distance in this case is equal to time distance. We need some time to better understand what has happened, and this will help us to cope with the situation.

The following principal factors provide the possibility to interpret the All-Russian creative school-contest “Portrait of your town” as the third implementation of the SSOL-model of educational process. As it was mentioned above, the main idea underpinned the creation of the SSOL-model was, while interacting with the learners, to take into account and to improve emotional intelligence of the learners.

We indicate a spectrum of the themes’ facets but not the theme. The children and adolescents participating in the main track of the school-contest are to ask the question about the existence in their towns of such precious peculiarities that the portrait of the whole country would be incomplete without describing these peculiarities. Every participant of the track “Say thank you” is to ask herself/himself whether there are such people in her/his surroundings that the interaction with whom turned out to be a defining experience for the participant. Children discover the delighting traits of character, the manner of speech, the ability to attentively listen to for a long time, etc.

After having delighted, a child or an adolescent is to critically have a look inside herself/himself and ask herself/himself whether she/he possesses the traits of the character delighted her/him and whether she/he wants to improve her/his character. The participants of the track receive the possibility to understand and to appreciate what they do know. We create a thought-provoking situation which stimulates children and adolescents to analyze facts, to think over, to develop critical thinking (when a school girl or boy understands that she/he doesn’t possess an attractive trait of the character).

The transfer of an experience from one situation to another situation contributes in many cases to developing *cognitive flexibility*.

## 5 GOODNET: THE GROWTH OF SELF-ESTIMATION IN PEOPLE OF USUAL, MASS PROFESSIONS

In every country, a great majority of people have the professions which don't attract public attention so much. This applies, in particular, to school teachers, hospital workers, nurses, bus drivers, postmen, gardeners. Such people usually believe that nothing in the country depends on them.

The victory of a school girl or boy in the track "Say thank you" becomes a thought-provoking event in a small settlement or town. In many cases, the local newspaper reports about both a child and an adult being the hero of her/his sketch.

As a result, many people in the country having usual, mass professions, have realized that they are able to make a difference for somebody at their working place. They become to be known in a small town or a village or in a district of a city. As a consequence, the self-assessment of these people increases. Children formulate new values; as a result, a new category of significant and distinguished people emerges.

**Example** (concierge). A 6 years old girl Vika writes: "It is monsieur Dima. He is a concierge in our home. Concierge is a man who defends us from bad people. Monsieur Dima is very kind. When I enter the home, I see him, and immediately my spirits are getting bright. Sometimes we are speaking, and sometimes he puts me on his shoulders and delivers me to the elevator, I am laughing. Monsieur Dima acts in this way, because he is kind hearted. Thank you, monsieur Dima, because you are kind and good".

The contest "Say thank you" has shown the significance for children and adolescents of the notion "a hero of our time". Simple people from their surroundings thinking and acting in terms of public good become such heroes.

The significance of the track can be better grasped in case we compare it with the World Wide Web. The great peculiarity of the Web is that it reaches every family, every person (being not a very young child). The track "Say thank you" can be interpreted as a digital platform for explicating estimation and distributing good. Then the track can be called GoodNet - it reaches every family, connects the generations and receives a response in every heart. The track "Say thank you" is a platform where the demand, significance, and reality of respectable attitude to each other bridges the gap between generations, explicates and enhances intrinsic interest towards other people.

## 6 CONCLUSION

Five written lectures posted on the Web site of the school-contest "Portrait of your town" form its methodical provision. These lectures are underpinned by the ideas of cognitronics and are prepared by the second author of the present paper. The essays composed by the region stage winners are submitted by the responsible specialists in the bunches via e-mail to the team of scientific advisors. The analytical year reviews of the results and the peculiarities of the school-contest (prepared by the scientific advisors of the school-contest – the authors of this paper) are posted in June on the Web site of the school-contest. Additionally, the results and the peculiarities of the school-contest of the year 2022 are discussed in a video record prepared by second author of the paper and posted on the Web. The link

to this lecture is distributed via e-mail by the responsible specialists from various subjects of Russian Federation.

That is why there are reasons to say that every year school-contest "Portrait of your town" can be interpreted as a small learning environment of a new kind.

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# The Case of the Civic University of Landscape/Living Environment as a Model of Learning/ Process/ Action for Ternary Systems Human/Society/Life Environment

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## ABSTRACT

The hypothesis expressed in this article is the possibility of linking in an evolutionary dynamic, beyond conflict, the world of nature to the world of digital information, whose entities are detached from natural constraints, distant from the reality of life and evolution but deeply rooted in it and now dominant. In spite of all this, Humanity - even though thus affected - remains an integral part of the Human/Society/Environment Ternary Systems, which are now facing the new Digital World, detached from Nature but capable of heavily influencing it, depriving them of their evolutionary prerogatives. All this is happening while increasingly dramatic crises affect the entire Biosphere, and while Science is getting closer to the deeper origins of Nature's dynamics and the self-creating roots of its evolution.

We propose to put in place Relational Structures of Research-Action and Learning, modelled on the complex disordered Systems of People, Human Societies and the Environment (in our case the H/S/E Ternary Systems) and the new Hybrid Human/Society// Living/Digital Environment Systems, where the disordered and complex World of Nature remains the protagonist of evolution, collaborating with the Digital World but not subordinating to it. We ground the concept of the Civic University of Landscape/Living Environment as a means of promoting and reconstructing relational and research-action in the disordered complex systems of our contemporary world.

## KEYWORDS

Disordered complex systems, evolutionary processes, ternary relationships Man/Society/Life // Digital Environment, experiential learning

## 1 INTRODUCTION

The sense of belonging to one's own community and living environment is common to all living beings and constitutes the Relational Structure that enables the formation and evolutionary becoming of every Ecosystem (see, in particular, [1]).

In contemporary, increasingly exasperated Human and

Thus the deep relational structure typical of any ecosystem is being replaced by mechanical and digital technological structures that now dominate most of their spontaneous dynamics.

The relationships spontaneously produced within the living world, thus weakened and overwhelmed by the external influence of the mechanical and digital world, also progressively disturb the learning dynamics and the transitional modes of all human and natural ecosystems on the planet.

In them, the accumulation, hetero-controlled preservation of "data" is opposed to their self- management and autonomous processing of natural learning that stimulates the evolutionary dynamics of the systems on which all life in our world depends.

Since the last century, the relational structure that Human/Society/Environment ecosystems have revealed to us through the approach of human ecology has been recognized as a structure common to all systems in our world, from physical to natural and human.

### 1.1 The Complex Disordered Systems

The Physics of *Complex Disordered Systems* has led us to discover the common roots of all the evolutionary dynamics of the world, and to recognize complexity and disorder as prerogatives shared by physical disordered systems, biological systems, and the most complex human and social ecosystems; all of which leads us today to recognize the world as a living totality in which all the dynamics of evolutionary transitions are mutually connected.

The latest outstanding achievements in Physics (Giorgio Parisi, Nobel Prize in Physics 2021) [7] teach us that the (evolutionary) transitions of nature's complex disordered Systems occur due to "various stimuli" due to certain parameters that in turn, during the system transitions, become more and more complex, depending on the characteristics of the systems with which they interact.

Today the parameters that have stimulated the transition dynamics of Human/Society/Living Environment

ecosystems, usually from the natural environment, are instead artificially produced in the digital environment and tend to dominate the evolutionary dynamics (which had previously brought systems to higher and higher levels of complexity) leading them to an increasing simplification their configurations, which become-paradoxically- more and more complicated.

In this new condition, it becomes urgent to keep these heterodirected mechanisms in control and to protect complex and disordered Systems by supporting their evolutionary processes, in contrast to the mechanical simplifications imposed by the Digital World.

## 1.2 Transition Dynamics of Human/Society/Living Environment

Taking all this as the foundation of our research/action within the ternary systems of Human/Society/Life Environment, we can reconstruct favourable conditions for multiple experiential learning processes, achievable through territorial Ecosystemic Laboratories.

These laboratories consist of a whole structure of relationships that support diverse experiences and non-hierarchical information exchanges. This whole in turn becomes an increasingly complex relational structure in which new knowledge and stimuli are processed and produced.

In this condition, information exchange occurs between the natural and digital environments, while this new environment accommodates the elaborations produced within the Laboratories and intensifies exchanges on a larger scale.

This whole in turn becomes a *relational structure* in which new knowledge is processed and new evolutionary dynamics towards new levels of ecosystem complexity are activated.

The case of the *Civic Landscape//University* can be emblematic as a research/process/action model for the ternary systems to which the participants belong. This can also be emblematic as a learning process model for ternary systems within which everyone can practice different types of action/research, strengthening the sense of belonging between participants and their living environments.<sup>1</sup>

This approach becomes strategic at a time when climate change is disrupting every environment, every human society and every living environment. At this step we can reformulate all ecosystem relationships and consequently all modes of social-environmental learning in its becoming.

## 2 THE SIGNIFICANCE OF CIVIC LANDSCAPE UNIVERSITY

This university is an experiential learning structure that can operate in any civic society that feels an active part of its life environment.

In each of these environments the affections, memories

and experiences (personal and social) originated in the multiplicity of human and natural dynamics that have characterized and transformed them over time.

Today all these environments have been pervaded by artificial dynamics (technological, cultural, financial) produced by the globalized/digital world that tends to dominate them all, creating in them another unexpected *hybrid living environment*. This environmental, economic, cultural and social crisis is reflected and leaves traces in individuals, societies and living environments, where processes of degradation and shattering are triggered from which new crises are generated and multiplied. Human/Society/Living Environment Ternary Systems gradually lose their capacity for self-control and their evolutionary autonomy, failing to counter the linear mechanics of the dominant globalized-technological-digital world and international finance.

The administrative, economic and territorial policies on which the transformations of H/S/E ecosystems are based are themselves conditioned by the pressures of the globalized world to which the Administrations fail to counteract the interests of citizens, who in turn are conditioned and overwhelmed by the uncontrollable intrigues of the dominant mechanics of globalization, down to the personal, behavioral and interpersonal level.

### 2.1 Ecological Dynamics versus Digital Mechanics

In these situations, there is no possibility of direct opposition between the ecological dynamics of Human/Society/Environment and the invasive technological, financial and digital mechanics that tend to dominate the planet, to the point of destruction.

At present, a global opposition to these phenomena is almost unthinkable, while it would instead be possible to sustain and promote multiple forms of resilience in ternary systems-already recognized as such-and activate new ones.

This can be realized through new forms of experiential practices addressed to different Ternary Systems, in a multiplicity of unpredictable *stimuli* and *relationships*. These can in turn give rise to new transitional phases and configurations in a succession of dynamic equilibria typical of all complex disordered systems, as occurs in Nature.

### 2.2. The Relational Fields

This open-ended relationality can create new and ever changing *Relational Fields*, whose dynamics go beyond the preconceived rules on which Artificial/Digital Games are usually structured (as opposed to the relational dynamics of Nature) toward new Plays of collective invention and joy, capable of stimulating new evolutionary transitions of ternary complex Systems composed of different interacting Entities, such as:

- People, with their desires, availability, competencies and active skills.
- Social groups interacting and practicing friendly mutual learning, a fundamental condition for the activation and self-regulation of processes;
- the Landscape/Living Environment identified from time to time as the Field in which the Action Research

<sup>1</sup> The *Landscape* is intended as *Life Environment*, according to European Landscape Convention, Florence, 2000



takes place and the evolutionary transformations are perceptible and directly appraisable by the participants. From their reciprocal and continuous dynamic interactions originate relational Fields, which give rise to new ternary Human/Society/Living Environment Ecosystems, still complex, disordered and in continuous transition.

### 2.3 The Relational Interface

The Civic Landscape University constitutes a relational Interface that, by interacting with these Ternary Systems, ensures that they maintain their own evolutionary dynamics in the face of the growing and oppressive abuses of power of the globalized/digital world.

**Wholeness**, circularity, dynamic H/S/Environment balances and equal interaction with the globalized/digital world are the basis of every activity of the Civic University of Landscape whose name already expresses the wholeness and multiplicity of Knowledge and Research Action differently expressed by its members:

- **University**, expresses the boundless wholeness of knowledge (with science, art and philosophy being part of it)
- **Civic**, expresses the totality of knowledge, values and desires present in every person, and in every society
- **Landscape**, expresses the totality of the living environment in all its natural, human, technological and even digital articulations.

### 2.4 The Common Good

These three components in turn express a concept of Common Good articulated in the different Environments of Life, a Field in which specific Research and Actions can be developed for the formation of stable participatory structures, differently rooted in each context, through specific methods to manage, protect and promote the different Environments of Life.

### 2.5 Where the Civic University can work

The conditions of discomfort, protest and awareness shared by the inhabitants of the many different environments of contemporary living, almost ignored or denied by political decisional structures, constitute fertile ground on which the activity of the Civic University can grow and articulate.

These conditions manifest themselves in different places and ways:

- *In mountain environments* already recognized by law but often usurped (excavation, theft of pastureland) or mismanaged by public agencies (municipalities, regions).
- *In usurped or privatized public lands*
- *In the sale of public housing* complexes valued as commodities in a speculative sense
- *In the poor planning of urban/metropolitan areas* that deny citizens civic services fundamental to their quality of life
- *In the abandoned agricultural areas* adjacent to population centers, exploited in favor of the development of private wellness centers and luxury sports facilities
- *In the denial of any prospect of management* of Services essential to the ecological vitality of densely populated areas (public transportation, food, sanitation,

neighborhood cultivation, care and maintenance of ecosystem relationships typical of any living environment, self-management of interactive digital environments)

- *In the impossibility of recovering* degraded contexts by activating specific modes of lasting interaction between people and the environment

- *In the impossibility of producing* new ways of working and circular economies in connection between local societies and living environments.

- *In the political arrogance of "Large Public Works"* and the profound alterations they induce.

### 2.6 How can the University be useful to Ternary Ecosystems

In any condition of socio-environmental distress where interactive ecological processes are activated or formed and where new stimuli, energy and creativity can come into play, escaping the traditional planning methods and problem-solving procedures (sanitation, health, waste, public transportation, etc.) usually chosen by government departments, the University is welcome.

### 2.7 Who can be involved in its activities

Experts from different disciplines who contribute to the knowledge of the complex systems interacting in each ternary H/ S/ E System and participate in learning and action-research processes modeled on each specific context.

Participants who, on a personal and/or social level, have had spontaneous experiences of action or struggle for the environment with groups, associations and committees in various social realities.

Exponents of cultural, scientific, educational and support institutions, in their national and local articulations, willing to activate and/or contribute to Participatory Social Learning Processes on the various Life Environments of reference.

National-regional administrative institutions already present and active in local contexts and willing to support innovative participatory processes aimed at the management, protection and promotion of the living environments under their competence.

## 3 THE WORKING GROUPS

Within the Civic Landscape University, different working groups are formed from time to time to establish friendly and equal interactions among the heterogeneous actors involved in participatory processes.

They support and encourage mutual learning and project/laboratory experiences on the changing dynamics of human /society/living environments systems and to independently address and control the pervasive phenomena coming from the globalized digital world. Thus, a new, unexpected Life Environment is formed in which the Digital World interacts-without overwhelming them-with the H/ S/ E ecosystems, which remain protagonists in their evolutionary processes.

In these new conditions multiple dynamic processes of ecological protection and promotion of the participants' living environments coexist, as well as self-management of the new living environments in connection with the Digital Environment.

In order to achieve more complex levels of mutual exchange and knowledge among all components of the new Living Environments, the Civic Landscape University is organized as a Structure of Relation and Propagation of scientific elaborations and experiences among concrete territorial realities that confront the abstraction of the digital world. All this can take place through the continuous interconnection between the theoretical elaborations, experiential realizations developed in the Ternary Systems and the digital components involved in this new "Hybrid Environment."

The University thus becomes a complex interface between Digital World and Ternary Ecosystems, in a continuous intertwining of digital/virtual and concrete realities that work in synergy and stimulate each other toward new stages of transition and dynamically balanced configurations.

#### 4 THE MODEL OF THE ORGANIZATION AND OPERATION OF THE UNIVERSITY

This model can be summarized as follows.

*0.0 General Introduction* - Development of social participation in ecosystems and the entire relational sphere (cf. Italian Constitution - Article 9).

*0.1 First round of meetings* - general themes and lived cases

- Human Ecology and Democracy in the living environments of contemporary societies
- The principles and criteria of the Ecological Approach compared with the principles and criteria practiced by territorial Administrations and Public Managers established in the territories according to the current democratic and economic "rules."
- Presentation of experiences already practiced, in progress or proposed by local groups, compared with the opposite approaches of local Institutions and Inhabitants (Collective Domains; Simeto-Panaro River Contracts; Metropolitan Crisis Management and Alternatives -

Florence Metropolitan Area).

*0.2 Second cycle - Relational reactivation* in complex (consolidated or exacerbated) Systems.

Experiences of rediscovering or reconstructing relationships in Ternary Microsystems to foster or highlight their evolutionary potential.

- Long-term (successful) experiential cases - La Pica Garden - Mirandola (Emilia Romagna).

- Experiences of contrasted participatory processes Palmaria Island (Liguria) the denial and destruction of the ecosystem.

- The usurped pastures of the Apennines (Abruzzo);

- the legal claim to collective ownership of their marble quarries (Apuan Alps, Tuscany).

*0.3 Third round - General discussion* on the contributions produced.

- Ecological/Systemic balance of contributions integrated and proposed in previous cycles.

- Fragility, stability, balance highlighted in the cases discussed.

- Comparative (critical) assessment of the state of Research-Learning Action in the presented cases.

- Proposals for the next cycle activities.

*Online publication* and extensive final discussion on the activities carried out.

Contributions and proposed problems discussed can be requested from experts and participants who have spoken or are interested in providing their suggestions and support for future activities.

#### 5 CONCLUSION

We would like to emphasize that the Civic University structure we have devised can become a fertile Research - Learning - Action Environment aimed at implementing new frontiers of knowledge and experience, both towards the most significant scientific elaborations of the 20th and 21st centuries and the implementation of new forms of experiential democracy

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# Were the Principles of Cognitonics Met in Online Education During the Covid-19 Pandemic?

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## ABSTRACT

Cognitonics is a scientific discipline developed with the aim of studying the human being in the digital world. The aim of this study is to investigate through survey and to analyse whether e-learning in which students suddenly found themselves, due to Covid - 19 pandemic, was conducted in accordance with some principles of cognitonics.

## KEYWORDS

Cognitonics, e-learning, online education, distance education, Covid - 19, pandemic, lockdown, survey

## 1 INTRODUCTION

Cognitonics is the science about human being in the digital world [4]. "It is the science about the trajectories of raising the human being to such level of intellectual and spiritual height where the scale of his/her personality becomes proportional to the scale of the digital world" [5]. It, among other things, questions the impact of information and communication technology on the identity (personality) of an individual, a particular group, or a society as a whole. Cognitonics seeks to point out the need for development of person's creativity and independent thinking, sense of harmony and beauty, awareness of belonging to a particular national culture or social heritage, language skills (primarily skills of quality use of the official language of the culture to which a person belongs), ethical behavior, abilities for self-regulation (i.e. monitoring and controlling one's own behavior),... within the society of rapidly developing information and communication technologies and globalization [10].

As we all witness, with the growing popularity of ICT – Information and Communications Technology, the popularity of online learning, especially in higher education, also arises [1]. Despite this, online (distance) education (e-learning) has not been involved in the educational process to such an extent. With the advent of the Covid - 19 pandemic, this changed so online education suddenly became the main mode of education. In general, educational institutions were not prepared for the sudden shift to online teaching, so as we witness this became a topic of many researches.

The question of this research was whether distance education during the Covid – 19 pandemic was conducted according to some principles of Cognitonics.

## 2 RESEARCH ABOUT IMPLEMENTING THE PRINCIPLES OF COGNITONICS IN ONLINE EDUCATION DURING COVID-19 LOCKDOWN

The aim of this research is to evaluate the realization of some of the Cognitonics' goals in online education during Covid - 19 lockdown in Croatia. With the closure of educational institutions, the need for a rapid and unexpected transformation from onsite to online learning emerged. The created survey shows to what extent online education due to Covid - 19 affected the mental and physical condition of students and was it conducted according to some principles of Cognitonics.

Created survey included 23 closed questions. The obligation of the respondents was to answer each question. The survey was created using Google Forms platform and distribution was conducted through the outreach of social media and messaging services. Clear instructions were provided to ensure that the respondents must be from a student population. No individual was forced against their will to fill in the survey and no identifying information was collected. When analyzing the results of the survey, descriptive statistical data analysis was used.

Total 50 answers were gathered through survey, so this paper can be a stimulus and can give an idea for further research.

### 2.1 Survey questions

1. Gender.
2. Age group.
3. Select your current level of education.
4. What is your perception of the situation in which you suddenly found yourself during the "lockdown" referring to the transition to distance education?
5. During distance education, was your creativity in different spheres mostly encouraged (e.g. creativity in expression, learning, communication, problem solving, etc.)?
6. If the answer to the 5th question was "Yes", choose in which spheres your creativity was encouraged during distance

education: creative expression, creative ways of using technology, creative ways of learning, creative ways of communication, creative task / problem solving, my creativity was not encouraged, I can't estimate.

7. If the answer to the 5th question is "Yes", evaluate whether your creativity was more stimulated during distance education than during classroom education?

8. During distance education, were you mostly encouraged to think independently and solve tasks / problems?

9. During distance education, was the development of your language skills mostly encouraged (was your spelling and grammatical correct expression in written/oral communication, creativity and task/problem solving encouraged)?

10. During distance education, was your ethical behavior mostly encouraged in communication, cooperation, solving tasks / problems?

11. During distance education, were you mostly encouraged to behave responsibly towards yourself and others when using information and communication technology?

12. Do you think that you have gained the same amount of knowledge and experience through distance education as you would have gained through classroom education?

13. Do you think that distance education has affected your mental state?

14. Do you think that distance education has affected your physical condition?

15. During distance education, did you experience a more individual approach to you as a student by the teacher than during classroom education?

16. During distance education, were you mostly a passive observer or were you encouraged to actively participate in the learning process?

17. During distance education, did you feel connected to the community in which you live (such as a community of fellow students; a community of friends; a community of residents of your city, etc.) or did you feel isolated?

18. During distance education, did you mostly encounter the understanding and empathy of the teacher for the situation you found yourself in?

19. Do you have enough prior knowledge to use technology during distance education?

20. During distance education, were you able to better organize your study time and free time?

21. During distance education, was your curiosity to acquire new information / knowledge / skills mostly encouraged?

22. How much time per day (during the working week) did you spend at the computer during distance education (to attend classes or to fulfil school / college obligations or to study)?

23. During distance education, were you as motivated to learn / complete your duties as during classroom education?

### 3 SURVEY RESULTS EXPLANATION

The results of the survey analysis show that there were 60% of male respondents, 32% of female respondents, while 8% of respondents did not want to make a statement about their gender.

The majority of the respondents (64%) were in the age group 19-24, 28% were in the age group 25 and more, and the rest of the respondents (8%) were younger than 19.

Regarding the current level of education, 72% of the respondents are in the higher level of education, 24% are in high school and 4% are in elementary school.

When stating what is their perception of the situation in which they suddenly found themselves during the "lockdown", and it refers to the transition to distance education, 56% of the respondents answered that it was positive perception. 24% of the respondents answered neither positive nor negative, and 20% answered that their perception was negative. These positive findings have also been confirmed in other researches [3] [13].

When talking about the creativity in different fields like creativity in expression, learning, communication, problem solving, etc., 48% of the respondents answered that their creativity was mostly encouraged during online education, 36% answered that their creativity was not encouraged, and 16% of the respondents could not estimate. Among respondents who answered that their creativity was mostly encouraged, 12% of them answered that their creative expression was encouraged, 44% answered that the creative ways of using technology were encouraged, 36% answered that the creative ways of learning were encouraged, 40% answered that the creative ways of communication were encouraged, 28% answered that the creative task / problem solving was encouraged, while the rest of the respondents where those who did not answer positively about creativity encouragement, or they could not estimate. It can be concluded that the creative ways of using technology were encouraged to the greatest extent and creative expression was least encouraged.

When asking whether students creativity was more stimulated during distance education than during classroom education, 40% of the respondents could not estimate, 32% of the respondents answered positive, 12% of them answered negative, and the rest of the respondents were in population which stated that their creativity was mostly not encouraged during distance learning.

When asking respondents were they mostly encouraged to think independently and solve tasks / problems independently during distance education, 68% of them responded positively, 28% of them responded negatively and 4% could not estimate. Other researchers also gathered the results which speak in favour that students were encouraged to take the responsibility for their own learning during distance education [13].

Interestingly, the same amount of the respondents (40%) stated positively and negatively to the question if during distance education the development of their language skills was mostly encouraged, and 20% of the respondents could not estimate.

When asking if during distance education their ethical behavior was mostly encouraged in communication, cooperation, solving tasks / problems, 52% of the respondents answered positively, 28% of them answered negatively, and 20% could not estimate. This is a positive indicator and points to the fact that it is possible to influence the ethical behavior of students so that, among other things, for example, the writing of online exams is in accordance with the principles of the educational system.

When asking if during distance education the respondents were mostly encouraged to behave responsibly towards themselves and towards others when using information and communication technology, 48% of the respondents answered yes, 28% of the respondents answered no, and 24% of the respondents could not estimate. For example, the need to

encourage responsible behavior among students during online communication is also emphasized in a paper written by Martinez [8].

In the next question, the respondents were asked do they feel that they have gained the same amount of knowledge and experience through distance education as they would have gained through classroom education. 56% of the respondents answered positively, 40% responded negatively and 4% could not estimate.

When talking about mental and physical state, 36% of the respondents stated that distance education had a negative impact on their mental state, the same percentage – 28% stated or that it had a positive effect, or that it did not have any impact on their mental state. 8% of the respondents could not estimate. This can support the statement that there is evident academic – related stress or anxiety which effects mental health and well - being of the students during distance learning caused by the pandemic [7][9][13]. Researchers also find out that although before mentioned issues, students were free of depression during distance education [13]. Interestingly, Zhou & Shang [13] stated in their study that students showed improved mental health during pandemic.

As for physical state, 44% of the respondents answered that distance education did not have impact on their physical state, 28% of the respondents answered that it had a positive impact, 24% of the respondents answered that it had negative impact, and 4% of the respondents could not estimate. This can be explained by the fact that the majority of respondents are in the age group that has already acquired habits related to physical activity, so the lockdown did not have a negative impact on that aspect of their lives.

When answering if during distance education respondents experienced more individual approach from the teacher to them as a student, than during classroom education, 48% of respondents answered no, 28% answered yes and 24% of the respondents could not estimate. This shows that, unfortunately, there are not enough human, time and material resources for an individual approach, which is often a problem with traditional education, let alone with online education. Similar results were found in other researches where the lack of interaction between student and teacher was found [3][13].

Furthermore, 60% of the respondents answered that they were passive observers during distance education, 32% of the respondents answered that they were encouraged to actively participate in the learning process during distance education and 8% of them could not estimate. This is the topic that must be addressed. Percentage in this answer has to be changed because one of the main goals of the online education must be to actively involve students to participate in the educational process. There are a lot of papers that specify how to actively engage students during distance education. For example: [12][14] etc.

When asking if the respondents felt connected to the community in which they live during distance education, 40% of the respondents answered positively, 28% responded that they felt isolated from the community, and 32% of the respondents could not estimate. Zhou and Zhang also stated in their research that students felt belongingness to their learning community during online education due to the pandemic [13].

When answering if during distance education respondents mostly encounter the understanding and empathy of the teachers

for the situation they found themselves in, 60% of the respondents answered positively, 24% answered negatively and 16% of the respondents could not estimate.

The only question answered 100% positively was the question asking did the respondents have enough prior knowledge to use technology during distance education. This proves that today's students are digital natives. It means that they use technology as an integral part of their everyday lives where they use it for internet searching, socializing, and communication [2].

80% of the respondents answered that during distance education they were able to better organize their study time and their free time, 16% answered negatively to this question and 4% of the respondents could not estimate. In other researches the same result was given – students were able to study at their own pace [13]. However, this is supported by the fact that the majority of respondents are between 19 and 24, so they have already acquired working and organizational habits.

When asking the respondents has their curiosity to acquire new information / knowledge / skills been stimulated during distance education, 60% of the respondents answered yes, 32% of the respondents answered no and 8% of the respondents could not estimate.

As the answer to the question how much time per day (during the working week) did the respondents spend at the computer during distance education (to attend classes or to fulfill school / college obligations or to study), 60% of the respondents answered 1 – 4 hours a day, 28% of the respondents answered 5 – 8 hours a day, 8% of the respondents answered more than 8 hours a day and 4% of the respondents answered less than 1 hour a day.

The last question of the survey was asking the respondents were they as motivated to learn / do their homework during distance education as they were motivated during classroom education. 40% of the respondents answered that they were less motivated, 32% answered they were equally motivated, 20% of the respondents answered that they were more motivated and 8% could not estimate. As already emphasized, during online education it is necessary to make students active participants in the educational process, and it is also necessary to motivate them to participate and learn in an online environment.

## 4 CONCLUSION

In this study, the survey was conducted with the aim of reaching a conclusion as to whether online education was carried out in accordance with some principles of Cognitonics. Findings in big part show that it was. Students mostly had positive perception about distance learning, their creativity and curiosity were encouraged, they were encouraged to think independently, their ethical and responsible behavior was encouraged. Also, most of the respondents stated that distance learning did not have impact on their physical state, that they felt connected to their community despite online communication, that they encounter the understanding and empathy of the teachers and that they were able to better organize their study and free time. The negative sides of distance education in this study were: slightly negative impact on the mental state of the respondents and lack of teacher's individual approach. Also, the respondents mostly

perceived themselves as passive observers in educational process and less motivated to learn and do their educational obligations while attending online learning.

At the beginning of Covid-19 pandemic, educational institutions were not prepared for sudden need for distance education. Researchers [11] show that at the beginning of the lockdown due to Covid – 19 pandemic, educational institutions were not prepared regarding ICT infrastructure, grading policy, student support etc. Students were in a worry about the efficiency of distance education and were confronted with academic stress, anxiety and depression. However, with the time passing by and educational institutions catching up with all the academic needs during distance learning, students demonstrated positive learning experience [6][13]. This study also shows that students' overall learning experience was found to be mainly positive. Despite that, findings in this study indicated that the Covid - 19 pandemic has made a significant impact on students. This situation highlights key challenges, provides an opportunity to further evaluate alternate measures in the online education and indicates the need to prepare educators and students for eventual future necessity of online education.

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# The Method of Cognitive Painting as an Effective Tool for Constructing a Positive Cognitive-Emotional Space for Children and Adolescents under Conditions of the COVID-19 Pandemic

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## ABSTRACT

The paper expands the authors' theory of dynamic conceptual mappings by means of introducing an original, broadly applicable method of creating a highly useful online method (or prop) being appropriate for the particular situation when children and adolescents find themselves in the pandemic restrictions launched into the digital cosmos without being trained to bear a flight lasting almost half a year, being a member of a busy crew, though they have never had an experience of being together with for twenty four hours a day. This method is called cognitive painting. Within an original online course "Cognitive-emotional personality development" in addition to the usual tasks the authors started up a project dealing with creating a new year story underpinned by students' own perception of snow (in case of snowy winters), their love towards their favorite Christmas toys, their Christmas wishes and hopes and underpinned by sound reasoning about Christmas gift in general, Christmas miracles and Santa Clause. 62 school children took part in this work (the age from 7 to 18 years). As a result, a 92-pages printed book is obtained as an output of that co-creative work. A very precious feature of the introduced method is that it can be effectively applied in arbitrary countries, taking into account the peculiarities of national culture and nature.

## KEYWORDS

Cognitonics, constructing a positive cognitive-emotional space, cognitive painting, cognitive-colour scheme, cognitive maturity, emotional maturity, creativity, student-self oriented learning model, personality development, theory of dynamic conceptual mappings, little "C" creativity, big "C" creativity

## 1 INTRODUCTION

The interpretation of cognitonics as the science about the human being in the digital world emerged one and half decade before the COVID-19 pandemic. This global dangerous event added new significant facets to the concept of the human being in the digital world. The average number of hours spent every day for interaction with computer systems (including Web) not

only by the adults but also by children and adolescents increased several times in comparison with previous value. This situation caused a number of negative impacts not only on physical health of the person but also on his/her emotional state and mental health.

During last year and the first months of the year 2021, many scholars from different countries analyzed the influence of the corona virus pandemic on moral state of children and adolescents, on the development of their negative attitude to the world. In particular, the papers [1], [2], [3] explicate, first of all, such negative phenomena as high rates of anxiety, depression, stress.

Proceeding from the fulfilled analysis of the situation, the authors of [1] indicate the necessity of creating the activities for improving "the individual health of children and adolescents and their families, the health of the community, and the intellectual and working capacity of these individuals over the long term, with positive economic and social results for each nation". Similarly, the authors of [2] underline the significance of helping children and adolescents to deal with mental health burden of the pandemic.

The study described in the present paper just satisfies these demands, the paper is of constructive character.

Our analysis has shown that cognitive danger of corona virus pandemic is a consequence of the following principal factors:

- Children and adolescents are bereft of their usual surroundings (school life, strolls with their friends, off-line education, extracurricular activity);
- They are bereft of co-creative off-line activity, which is underpinned with strong emotions, discussions, brainstorming sessions in which all the members of a group suggest the ideas and then discuss them;
- Children and adolescents are bereft of off-line group activities, such as round table discussions, sport events, creative contests, balls, parties, museums;
- Their interaction with the parents is an illusion, because parents are at home but in fact they are not. The are

working online all the day. It disappoints children's hopes and looks like the fraud, it doesn't meet their expectations. Children have to make peace with it, but it is difficult, even impossible in particular age.

In this connection let's try to have a look at the work of astronauts on board of the cosmos station during a long period of time (half a year, for example);

- Astronauts are grown-up people who know beforehand how long they would stay on board of the station;
- They are trained well how to cope with the restrictions of all kinds;
- The members of the crew are well matched psychologically and roughly equal in ability, they are well motivated and are inspired by what they are doing;
- Each of them is highly involved in the activity he/she is carrying out, and it helps to overcome the restrictions.

We may assume that children and adolescents were launched into the "digital cosmos" without any preparations and, due to their small age, they were lack of highly motivated creative activity and ability to initiate creative work which could be overwhelming.

Negative response to the situation of restrictions and the necessity to work hard without improved ability to think over and then put forward his/her own ideas, without being propped up by the creative surroundings makes it clear that children and adolescents need an emotional and creative prop.

We have invented a broadly applicable method of creating a highly useful online prop being appropriate for the particular situation, when children and adolescents find themselves in the pandemic restrictions launched into the digital cosmos without being trained to bear a flight lasting almost half a year, being a member of a busy crew, though they have never had an experience of being together with twentyfour hours a day. This method called *cognitive painting* is stated below.

The main impulse to the birth of cognitronics was given by our Theory of Dynamic Conceptual Mappings (the DCM-theory). During the first decade of its development the central idea was as follows: while thinking over how to inscribe a piece of theoretical materials into the conceptual world's picture (CWP) of a learner, it is useful to find (or to create during a lesson) in his/her CWP a bright, positively coloured fragment and to establish a correspondence between the entities and relationships from the considered piece of theory and the entities and relationships from this selected (or created) fragment of CWP [9, 10, 23-28].

Last year we faced a new problem: not to introduce a certain piece of theory but to initiate positive changes in the children's attitude to the world, in their moral state. That is why we transformed the central idea of the DCM-theory and suggested the following method called *the Method of Cognitive Painting*:

**Starting situation:** The learners (the children or adolescents) are morally suppressed by certain

circumstances, their vision of the situation is negative or mainly negative.

**Recommended way out (the most general formulation):**

*Step 1.* Try to find in the CWP of the learners certain bright, positively coloured fragments.

*Step 2.* Invent a kind of intellectual, emotional activity closely linked with found bright, positive fragments of the CWP and transporting the positive colour of such fragments (or a fragment) to the perception of the current situation.

The next sections describe our successful implementation of this method by means of distance education. Besides, we set forth the theoretical foundations of our method in addition to the ideas stated above.

## 2 SCIENTIFIC FOUNDATIONS OF COGNITIVE PAINTING

### 2.1 The Method of Drawing Together Little "C" and Big "C" Creativity

The paper [4] presented a new look at little "C" and big "C" creativity. Big "C" creativity (BCC) is regarded in connection with the creative ability of outstanding scientists, musicians, painters, writers, poets [2]. Smart society demands little "C" creativity (LCC). It reveals the smart society's necessity of creative thinking [3, 4] and creative approach to solving the every-day tasks. LCC improves problem solving skill, which is one of most important skills.

BCC is defined by two main characteristics. It is regarded as original and highly significant creative activity for big groups of people. Creativity of children (LCC) usually is subjective and is defined by their previous knowledge. The main characteristics of LCC is their imagination [8]. Smart society demands the necessity of supporting and improving LCC in order to create the preconditions for increasing the proportion of the specialists in significant application domains who possess BCC.

Our paper [4] suggests a method of combining as early as possible LCC and BCC in the process aimed at realizing the Thought-Producing Self (see [9], [10]) of the child.

*The first step* of the method suggests the understanding by the children of the significance of thought. It helps to return the notion "value of thought" to the world's conceptual picture of the school children.

*The second step* suggests the awareness of the school children of the fact that their ideas, metaphors, way of viewing nature, communicative situations, the pictures, etc. may be highly significant for relatively big groups of people in case of sharing their ideas with the others. The reason is that they have given a sophisticated look at something and have revealed an example of serendipity (the ability to make pleasant and unexpected discoveries entirely by chance). It happens due to their natural ability to see out of the way things in usual things and usual things in out of the way things. It might be thought provoking for grown-up people.



**Example** (one of the examples of nature inspired behaviour). “The crown is sitting on the twig. The crown is heavy and big, the twig is thin. But the crown is no nervous. It is not afraid of the fact that the twig may break, because the bird doesn't think about the twig, it trusts its swings” (Anne, a seven year girl).

*The third step* is to make children aware of the beauty and wisdom they have discovered, because in most cases they do it without a second thought, intuitively. It just dawned upon them. They need encouragement to continue mental and spiritual work on that level. Their efforts and their inspiration should be discussed and appreciated by the community.

*The fourth step* is to show the examples of BCC revealing the same idea to make children believe that the value of thought doesn't depend on age and experience, but age and experience help us to penetrate the very essence of the thought, to comprehend it.

In the case considered in the present paper, we work with little “C” creativity, and, as a result, it reaches the level of the big “C” creativity. That means the situation when the written stories of the children, adolescents, and even grown-ups reveal the images and the way of consideration on such level that it is possible to put them together with images and ideas of such great poets as Alexander Pushkin and Boris Pasternak.

## 2.2 Student-Self Oriented Learning Model

Our method of cognitive painting introduced in the present paper is based on the Student-Self Oriented Learning Model (SSOL-model). The principal motive for its creation was the idea that educational processes in knowledge society (or smart society) should be based much more on taking into account and improving emotional intelligence (EI) of the learners.

The SSOL-model is defined as the model being beneficial for self-cognition and self-construction through the prism of the acquired knowledge and life experience [11], [12], [13], [14], [15]. The principal distinguished features of the SSOL-model are as follows: (a) it takes into account and bases educational process on EI of the learners; (b) it aims at reaching cognitive engagement of the learners; for this, it proposes a conceptual learning environment instead of the environment based on mechanical remembering (it means addition of emotional color to the studied notions and, as a consequence, makes much easier the comprehension of these notions).

## 2.3 The Role of Cognitonics

The SSOL-model is one of the fundamental results of a new scientific discipline called cognitonics, or *the science about the human being in the digital world* [13], [15], [16], [17], [18], [19], [20], [21], [22]. The birth of cognitonics was prepared by the authors' papers [23], [24], [25], [26], [27], [28].

The authors organized as the co-chairs seven international conferences on cognitonics in conjunction with the international scientific multiconferences “Information Society” (Slovenia, Ljubljana, Jozef Stefan Institute, October

2009, 2011, 2013, 2015, 2017, 2019, 2022, see [https://is.ijs.si/?page\\_id=903](https://is.ijs.si/?page_id=903)). Totally, the researchers from 24 countries participated with the papers in six international conferences on cognitonics.

In [13], [15], [22], the authors formulated the following expanded definition of cognitonics: *it is the science about the trajectories of raising the human being to such level of intellectual and spiritual height where the scale of his/her personality becomes proportional to the scale of the digital world.*

Cognitonics provides the methods to reach cognitive engagement of the learners at the lessons and to arise their curiosity.

The ideas and methods of cognitonics underpinned a number of educational projects in several countries, in particular, in Croatia and Macedonia [29], Croatia [30], United Kingdom [31], [32], and Mexico, United Kingdom and PR China [33].

## 3 THE METHOD OF COGNITIVE PAINTING

Let's consider our successful implementation of this method. Within an online course “Emotional-imaginative personality development’ in addition to the usual tasks, we have started up a project dealing with creating a new year story underpinned by students' own perception of snow (in case of snowy winters), their love towards their favorite Christmas toys, their Christmas wishes and hopes and underpinned by sound reasoning about Christmas gift in general, Christmas miracles and Santa Clause.

This story aimed at evoking their emotions, reminiscence of childhood, memories of Christmas and New Year parties, favorite Christmas decorations and toys, the recalling of past events and pleasant experiences, penetrance into the magic world of whirling snow and even the world of heavy Christmas snowfalls, Christmas holidays when children can enjoy the snow in lots of way, can put on skates and have a slide across the ice may somehow “outwit” the exhausted brain and let it have an inspiring rest, plunging into reminiscence of favorite things.

The similar idea underpins the well-known song “My favorite things from the wonderful film “The Sound of Music” (1965):

“Girls in white dresses with blue satin sashes,  
Snowflakes that stay on my nose and eye-lashes,  
Silver white winters that melt into spring,  
These are a few of my favorite things.

When the dog bites, when the bee stings,  
When I am feeling sad,  
I simply remember my favorite things,  
And then I don't feel so bad”.

This approach has nothing to do with virtual reality, on the one hand, but it is used with the help of the opportunities provided by the digital space in general and online education, in particular. With the help of virtual reality, human try to outwit the brain, but they immediately face the danger of addiction (like drug addiction) with all possible consequences ahead.

In November, we distributed via e-mail an initial version of a new year story, it consisted of four pages and contained the slots on the themes listed below for inserting later the students' compositions. By the middle of December, we obtained a printed book "Wonderful New Year Story" composed by 62 students (from 7 to 18 years old) and consisting of over 90 pages. The book includes also several colourful Christmas pictures done by the students. Printing a book was aimed at showing vividly to the students and their parents the results of their intellectual and emotional efforts, the power of creativity, its possibility to transfigure the reality.

In the considered case, the children were given a four-page frame of a specially invented new year story with three slots introduced as follows:

- Describe the snow, snowflakes, snowfall, snow like a carpet of resplendent hue;
  - Describe your favorite Christmas toy and explain why it is your favorite toy;
  - Write about your Christmas wishes, what are you dreaming about at Christmas time.

The story itself describes one Christmas Eve when two children (brother and sister) were at home alone. They were looking at the window painted silver by frost and waiting for their parents. And outside it was solemn snowfall. Then children and adolescents were asked to write about the snow.

Children were given the poetical examples of viewing the snow when the rhythm of falling snow and whirling snow is compared with the pace of life: a solemn snowfall like the slow pace of life in the country; heavy snowfall when it is stormy outside, and the windows is roaring like the perception of life when it seems to quicken its space, and it is difficult to keep up with it.

The falling snow seems to reveal the pace of life which is going on with the same laziness or with the same swiftness keeping pace with heavy snowfall or walking in step with the falling or whirling snow.

Boris Pasternak made an assumption that the year is following the year like the snow is falling or like a word is following another word in the poem. In one of the poems Pasternak gave the following metaphor: "In the gate a snowstorm is knitting the net out of the swiftly following snowflakes".

It is possible to say that the children were given some space drawn by the world known poet Boris Pasternak (big "C" creativity) to express their way of viewing and perceiving the snow to reveal little "C" creativity. The idea is to inspire children and adolescents to hover about the reality and give birth to some

other ways of viewing the usual things (out of box thinking based on putting together little "C" and big "C" creativity.

We received 62 descriptions of snow.

**Example 1** (Katja G., 11 years old).

"... You are keeping a snowflake on your palm It is not melting, because it trusts you. If it doesn't melt, it means that you have tamed it. And it has nothing to do with the fact that you are wearing a glove".

**Example 2** (Katja F., 10 years old).

"In the morning I looked out of the window. The whole sky was covered with snowflakes, they were whirling as if they were dancing. I went out to enjoy the snow. I stepped on the snowflake, and it took me up to the heaven above the clouds. I looked up and saw the blue dome of the infinite sky where the snowflakes were born".

**Example 3** (Alyona V., 17 year sold).

"The snowfall is crying quietly  
Whipping off the face of the day.  
The sunset's enfolding the garden  
And the peace is spread above".

**Example 4** (Herman N., 9 years old).

"White snowflakes are spreading afar, covering colourful autumn leaves, making a carpet of resplendent hue, it is crunching pleasantly. I looked up and found that the snowflake which was the fairest of all. I called her Snowy. She was dancing gracefully. She was very delicate. She was the miracle created by Nature".

**Example 5** (Savely O., 17 years old).

"I like snowstorm, because it is the only element that can dance. I like to dance with snow in pair, matching the speed and rhythm of music.

I like to learn new dance steps and to dance to the music of the snow and the wind with delight. When the storm dies down, and the dance is over, I have my red cheeks not due to the fact that the frost is hard, and the snowfall is heavy, but as a reminder of my excitement and pleasure, because the partner is perfect, and we have been dancing all the way to my school".

The obtained results allow us to say that a new, broadly applicable method of constructing a positive cognitive-emotional space for young children and adolescents is created. It may be called *the method of cognitive painting*.

During the last decade, it has been broadly realized that education in knowledge society (or smart society) is to pay a particular attention to supporting and developing in the learners the significant, domain independent skills called soft skills [34], [35] or transversal skills [36], [37], first of all, analytical and critical thinking, creativity, out of box thinking, thinking and acting in terms of public good.

The examples received from children and adolescents show the revealing of creative thinking, out of box thinking, analytical

thinking, and figurative reasoning. The application of the SSOL-model supports and improves emotional intelligence and imagination. That co-creative work underpinned with the SSOL-model helps to transfigure the reality (which is the property of the big “C” creativity).

### 3 CONCLUSION

1. Cognitive and emotional maturity has a strategic significance, because it leads to active creative work and helps to improve out of box thinking. Under the condition of pandemic situation, it helps to expand the limits of life space and helps to substitute obvious restrictions by the strong cognitive activity giving way to mental representation of one’s spiritual life.

2. Student-self oriented learning model, used in our approach to solving the problem of unexpected location of non-trained children and adolescents on board of “digital space ship”, is proved to be fruitful, because it leads to cognitive engagement and strong emotional output. We “outwit” the brain, and it doesn’t suffer from the restrictions.

3. The necessity of having an emotional and creative prop in the situation when children and adolescents are bereft of off-line group activities, such as round table discussions, sport events and creative contests, parties, balls, museums gives birth to a new cognitive tool called cognitive painting, when a so called “cognitive-colour scheme” is given with the help of big “C” creativity (in our case - the poems of the world known poets such as Alexander Pushkin and Boris Pasternak). Several slots are constructed within the frame of the poems in order to make children fill the slots, occupy all the space in these cognitive slots with descriptions and metaphors based on their own way of viewing the given entity or subject under discussion.

4. 62 school children took part in that work (from 7 to 18 years old). As a result, we have a 90-page printed book as a result of that co-creative work.

5. It proves the existence of the ability to create a positive cognitive-emotional space for young children and adolescents (without using virtual reality), using thought-provoking cognitive activity leading to strong emotions and, as a result, leaving a semantic trace and evoking overwhelming fruitful spiritual and intellectual life for each personality and for community in general.

6. A very precious feature of our method is that it can be effectively applied in arbitrary countries, taking into account the peculiarities of national culture and nature. The initial version of the new year story and the slots may be used without any changes in the countries with snowy winters.

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# Chess as a Tool for Developing 21<sup>st</sup> Century Skills with a Deliberate Practice Approach

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## ABSTRACT

How to study to achieve the highest quality of acquired knowledge? Modern pedagogical approaches have extended classical learning of specific content and propose to learn general skills applicable to specific needs through targeted practice. Chess is a good tool for this purpose. It allows the simultaneous development of many skills that can be transferred to different areas of life in the 21st century. Chess training includes several aspects and protocols of deliberate practice approach, which makes it a modern educational tool.

## KEYWORDS

Chess, 21<sup>st</sup> century skills, deliberate practice

## 1 MODERN PEDAGOGICAL APPROACH

Christodoulou [7] points out that experts in all fields rely on extensive and detailed knowledge structures stored in their long-term memory. These structures, often referred to as schemas or mental models, enable the expert to encounter new problems and solve them with ease. How can one reach the highest level of this knowledge, which can be applied to various areas of life?

### 1.1 Deliberate practice approach

Modern pedagogical approaches favor the generic competencies and, in particular, deliberate practice over memorization, which focuses on specific knowledge and regular practice. The main problem with the generic skills approach is that the skills learned under this term are usually specific rather than generic. The goal is to teach the desired skill directly, with activities reflecting the desired end product. However, the educational process should develop general skills such as problem solving or critical thinking that can be applied in many different areas of life. Deliberate practice is an appropriate approach for this purpose. It means practicing with a clear awareness of the specific components of a skill we want to improve and knowing exactly how to improve it. While regular practice involves mindless repetition, deliberate practice requires focused attention and is done with the specific goal of improving performance. Deliberate practice is a way to improve a skill through a series of planned activities, reflection, and collaboration. This includes setting personal goals, targeted practice and feedback, observing and discussing lessons, and monitoring one's progress [21].

### 1.2 21st Century Skills

What should be the content of modern learning? The experts' answer is: "21st century skills, sometimes called "executive

skills" or "soft skills," are non-academic thinking skills that involve managing oneself and available resources to achieve a goal [9]. They are necessary to develop successful work habits, organization, time and materials management, project planning, and mental control with self-regulation. Examples include adaptability, time management, impulse control, collaboration, organizational skills, decision making, and project management [1]. Most definitions of 21st century skills include critical thinking with problem solving, creativity, and communication with collaboration.

The 21st Century Learning Model (see Figure 1) is a unified vision for learning to ensure student success in a world where change is constant and learning never stops. It defines and illustrates the skills, knowledge, expertise, and support systems students need to succeed in work, life, and society [2].



Figure 1: 21<sup>st</sup> century skills with learning model

### 1.3 Obstacles to instructing and assessing 21st Century skills

The challenges and considerations for assessing 21st century skills that the educational community must resolve are: poorly defined constructs, limited understanding of how students develop these skills over time (e.g., learning progressions), lack of understanding of the interactions and relationships among the various skills, the appropriateness of separating skills from content and context. The 4 C's are not adequately addressed in the core curriculum [11]. Can chess in education be the solution?

## 2 EDUCATIONAL VALUE OF THE 21<sup>ST</sup> CENTURY CHESS

Although the game of chess is over 1500 years old, it seems relevant to address the challenges of modern centuries. Chess, a

highly motivating and potentially competitive game, can be a valuable tool for developing many of the 21st century skills, as they are central factors in successful play. These skills are needed by future citizens who must be adaptive problem solvers. In the study by Chitiyo et.al. [6], 62 teachers assessed eight skills of 1,502 students in the chess group and 634 students in the non-chess group. Teachers rated higher improvement in problem-solving skills (3.9 versus 3.5 out of 5) at all grade levels among the chess players. Students in the chess group were rated as better problem solvers (78%), critical thinkers (73%), and strategic thinkers (75%). Students in a chess class reported working harder on their schoolwork (82%), enjoying learning more (76%), and now being able to solve the most difficult problems when they try (80%). Results from the Chess in Education program (CIE) [8] showed increased enthusiasm for learning, an increase in overall knowledge, an increase in student attendance, an increase in self-confidence, an increase in parent involvement, etc. According to the studies presented in McDonald [20], chess develops several generic skills such as concentration, patience and perseverance (with careful and concentrated observation), visualization (imagining the sequence of moves before they actually happen), planning (thinking a move in advance; in chess you must think first and then act. There should be no impulsiveness. You need to see the possible consequences of your actions), weighing options (you do not have to do the first thing that comes to mind. There are other options as well. We need to consider them), accurate analysis, systematic, scientific thinking, precision, logical reasoning, abstract thinking (a chess player needs to see the big picture), curiosity.

Sala and Gobet conducted a meta-study [24, 25] to verify the validity of several previous studies showing the beneficial effects of chess and its transfer to other domains. They concluded that chess practice enhances some general cognitive skills, such as short- and long-term memory, executive functions, metacognition, visuospatial skills, critical appraisal, and general intelligence, which in turn improves students' academic performance. The analysis also showed a direct correlation between the duration of the chess intervention and the magnitude of the effect. Costello [10] argued that the positive effects of chess also depend on the appropriateness of the approach and the developmental period of the training (the best period is early childhood). Further, we present studies showing that chess develops some of the core skills of the 21st century, as shown in Figure 1.

## 2.1 Critical thinking and problem solving

Ferguson's systematic study [14] shows that chess was more effective in developing critical and creative thinking than any other "enrichment" activity he tested. An innovative, groundbreaking initiative to promote child development through chess in schools, Alabama Chess in Schools [1], similarly showed that critical thinking skills (measured with Cornell Critical Thinking Test) improved more for students playing chess in the lower grades, but not as much in the upper grades.

Chess players are problem solvers. Every day they practice solving chess problems. In this way, they develop not only analytical and problem-solving skills, but also perseverance to find the right solution [3]. From a functional point of view, a

chess player is a self-determined, persistent problem solver who is ready to face any challenge [19]. Mikhailchishin [22], a top chess grandmaster and one of the best coaches, describes the thinking and decision making of chess players on the three levels:

1. Based on precise acquired knowledge (e.g. openings)
2. Logical reflection (calculation of variants)
3. Intuitive decision (gut feeling/implicit decision based on a large knowledge base)

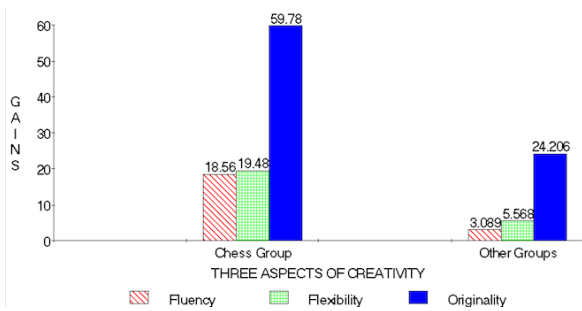
Jelen [17] defines the process of move selection with the following steps:

1. After each opponent's move, before each intended move, sometimes even during variant calculation, a chess player asks himself: Which move is a threat and over which important squares has the opponent gained control? What has the move overlooked or given up control of?
2. The evaluation of the position.
3. Based on the evaluation of the position, the chess player makes a plan for further play.
4. On the basis of the evaluation and the plan, the player selects all candidate moves that should be considered in choosing the best move.
5. He calculates all the candidate moves and makes an evaluation of each move based on the calculations.
6. He selects the best move, i.e. the move with the best evaluation. When he re-checks it, the move can be played.

A chess player must also learn to manage time (he plays against the clock or against a time limit set by the coach, with rapid chess being the most challenging). He not only knows mathematically the difference between five and ten minutes, but he also knows how these different periods of time feel. Chess players need to control impulses (holding back a move until both players' positions have been assessed, and considering cause and effect when making multiple moves) and organize materials (pieces on the board) [4]. These are crucial skills for standardized testing situations, in which experienced chess players generally feel more comfortable because they have a lot of practice in dealing with different amounts of time and stressful situations [8].

## 2.2 Creativity and flexibility

Creativity is a phenomenon in which something new and somehow valuable emerges, usually based on existing knowledge. In chess, almost every move is creative because no two games are the same, but a lot of chess knowledge is required. Former world chess champion Gary Kasparov said, "*Chess is not about being an inventor with occasional flash of creativity, but about being constantly innovative in your decision-making process.*" In chess, you also have to be flexible because the position changes with each move and you have to adjust your calculations and evaluations. Creativity adds a motivational note to the game of chess. As former world champion Kramnik said "*a chess player feels beauty when he succeeds in creating situations that contradict expectations and the rules, and when he manages to master that situation*". According to Ferguson [15], chess players are better than non-chess players in various aspects of creativity: fluency, flexibility, and originality (Figure 2).



**Figure 2: Comparison of the increase in creativity aspects with chess players and non-chess players [15]**

### 2.3 Communication and collaboration

Chess emphasizes the importance of good sportsmanship and respect for others. The nature of chess as a "gentleman's game" contributes to the development of positive interpersonal relationships as well as the formation of lifelong friendships based on a common interest, despite participation in competitions. Chess also teaches players to listen well [23]. Many sales managers recommend the 80-20 rule of listening 80% of the time and talking 20% of the time. Educators from the Chess in Education (CIE) program [5] have found that chess creates a bond between students and teachers and improves the classroom and school environment. In a year when the pandemic and distance learning have caused many students to miss out on the social learning that occurs during a normal school year, CIE can help overcome this deficit. Chess is also good socialization training. A study by McDonald [20] showed that introducing chess to children with special needs reduced suspensions for misbehavior by 60%.

### 2.4 Chess as deliberate practice

Chess has been shown to be a powerful pedagogical tool by making deliberate connections for transferring skills to other domains. Educators attribute the depth and breadth of chess's effectiveness to many factors: Chess accommodates all learning modalities and requires the integrated use of multiple skills simultaneously. In chess, there is an almost infinite variety and quality of problems to solve. There is always a problem that has not been seen before. Some are simple, while others are difficult and complex. Chess provides immediate punishments and rewards for students' choices (during play) on the one hand, and requires the ability to delay the reward between practice time and play on the other. The game of chess causes players to develop a particular style of thinking in which they are always looking for more and different alternatives. Competition in chess increases motivation and mental alertness [18].

Chess training in many ways follows the protocol of deliberate practice:

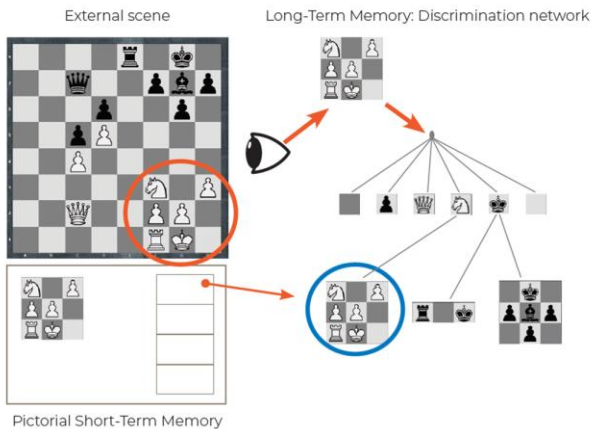
- **Goal setting and focused practice:** no chess training can begin without setting goals. Among the inevitable questions in chess training are: Will the training focus be on the opening, the middle game, or the endgame? Which opening will we train, and what do we want to achieve

with it? What is my short- and long-term goal? Both the training process and playing require a high level and long lasting focus. In chess, one bad move may nullify 40 good ones.

- **targeted feedback, observation and discussion of lessons:** evaluation of one's game is inevitable in chess. Moreover, each game of a chess player is carefully analyzed with the computer and the trainer from different aspects (chess, psychology, time management), so that a chess player can progress.
- **monitoring your progress:** chess progress can be easily measured not only by the result, but also by the ELO rating. This is an objective measure of the chess player's strength.
- **modelling:** if you want to advance, you need to learn from the best. During training, a chess player must analyze hundreds of games of better grandmasters to improve his performance. He must understand why they are so good - what do they do differently, how do they think, etc. The process of recreating excellence is called modelling. It starts with finding a suitable expert who best fits your learning objective (e.g., the best player of a particular chess opening). Then you should collect the relevant information (instructive chess games). As with deliberate practice the complex behaviors should first be broken down into smaller meaningful parts (called chunks), transparent components, following the rule "as simple as possible and as complex as necessary" (e.g., chess motif). Any task is manageable if it is broken down into sufficiently small parts and trained step by step from an early age (see Figure 3). These units are later recognized during play and recalled when deciding on the best move (see Figure 4). The player then organizes the patterns into logical, coherent structures (opening tree), tests the effectiveness of the model (plays a game), if possible, reduces the model to the simplest form that leads to the desired result (deletes irrelevant lines), identifies the model to transfer the knowledge to other (similar) situations (understand in which position a particular motif works and where it doesn't), evaluate the model (results) and understands its limitations (where the particular position and adequate move does not correspond to the learned line) [13].



**Figure 3: Step by step learning [26]**



**Figure 4: Example of a pattern in a chess position [16]**

Chess is an active teaching tool that leads to comprehensive acquisition and development of higher skills, independent learning methods, comprehensive acquisition and higher motivation to work. However, it is extremely important to create a classroom environment where students feel safe and accepted, respect diversity and differences, allow for differing opinions and criticism, and where mistakes challenge learning and collaboration. The way in which knowledge is acquired should follow the circular experiential learning from critical games [12] in the following protocol:

1. Concrete experience: we first select a critical game, where we encounter problems or lack of understanding.
2. Reflective observation: analysis of thought processes and experiences during the game (written down immediately after the game) together with a time consumption analysis.
3. Theoretical analysis: chess-psychological analysis of critical games after the tournament based on data from chess books and other sources of knowledge.
4. Active experimentation: in unimportant games we can test new insights, ideas and skills gained in earlier stages of learning.

Last, but not least, the learning environment is a game, but the effects can be transferred to other areas. Studies and projects on chess as an educational tool are underway, one of which is the project CGS: Chess: a Game to be Spread in schools, funded by Erasmus+ and ECU.

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# Karma and Dharma :

## Two ways of human living

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### ABSTRACT

Karma is causality beyond life and death. One may suffer the effects in this life due to the causes in the previous lives. Dharma is the principle of overcoming this karma. This article tries to make clear the structure and process of karma. And through understanding these two concepts of living a life, one may find a solution for self-development.

### KEYWORDS

karma, dharma, reincarnation, causality, karmic structure, karmic process

## 1 INTRODUCTION: TWO CONTRASTING CONCEPTS IN THE RELIGIOUS AND SOCIAL CONTEXT

Indian philosophy is abundant in religious concepts and thoughts which can be applicable to contemporary human society. Above all, karma and dharma are essential and have many implications for human life. These concepts are used in broader religious, social, and cultural environments with the background, not only of Hinduism or Buddhism but also of Christianity or Islam.

The word karma has been understood as fate and has become a general and popular term in the West as well as in the East. Karma is understood as the law of cause and effect. But this law has continuity beyond life and death, which is reincarnation. Sufferings resulting from sin in previous lives, called karma, are almost synonymous with fate. But the term karma originally means action in Sanskrit. And at the same time, it signifies the result of the action. It hints that human activity intrinsically includes negative characteristics.

Dharma is an ethical concept, and it has been developed and formulated as a moral ordinance, especially in the Buddhist doctrine, which is not based upon the idea of God. The concept of dharma is related to the righteous value criteria, law, and religious symbols. Historically, it has been used as the name of Buddhist saints, idol, and in the Indian national flag. Socially and spiritually, dharma signifies the ideal law requiring men's ideational lives.

There are so many references with a profound analysis of each concept in the field of humanities, but I could not find one that considers them as a

paired concept and set it as the central principle of life.

In this paper, I analyze the two concepts with a focus on the relation between the two, and categorize two individual or social logic of life concerning the overcoming of the ego.

## 2. KARMIC LOGIC

### 2.1 Reincarnation as the precondition of karma

If we try to understand the karmic logic, we must recognize the reality of reincarnation<sup>1</sup> of the human being as its precondition because karma develops its logic through rebirth. You should suffer, but you must not know the reason why. That which connects this gap between ontological Grenzsituation and epistemological agnosticism is rebirth; that's why no reincarnation, no karma.

In the 18th century, Swedenborg made a significant contribution to the understanding of the afterlife based on Christian mysticism. In the early 20th century, Evans-Wentz made a decisive interpretation of death and rebirth by introducing the Tibetan Bardo Thodol [2].

Bardo Thodol's process is precisely described as below, in modern terminology: "The first contest of the soul in each incarnation is other souls seeking rebirth. With the union of sperm and ovum to begin the formation of a new human body, a flash of light appears in the astral world, the heavenly home of souls between incarnations. That light transmits a pattern which attracts a soul according to that soul's karma- the self-created influences from actions of past lives. In each incarnation, karma works itself

<sup>1</sup> The process of reincarnation has been described in not a few mystical religious books. And recently, the reality of reincarnation has been reported by those who have extraordinary talents in this field. But it is still terra incognita, the scientific test of which is not completed. Science may criticize this issue as unscientific or superstitious because it does not know much about that. But that means that science is not so much advanced as to understand that.

Evans-Wentz mentioned a similar point: Thus while the Occidental may not question the validity of this law of cause and effect when applied to physics, he does question it when applied to psychics, he does question it when applied to universally to psychics. In assuming such an attitude, the Occidental, in the eyes of the Oriental, ceases to be scientific, inasmuch as he fails to see that in any complete science of man the physical cannot be separated from the psychic ([3], p. 47).

out partly through hereditary forces; the soul of a child is attracted into a family in which heredity is in conformance with the child's past karma. Many souls vie to enter this new cell of life; only one will be victorious (in the case of a multiple conception, more than one primal cell is present) ([4] p.7).”

This shows once more again that reincarnation is deeply related to karmic law.

### 2.2 The structure and process of karma

Many people in the East Asian social culture often say, when they suffer seriously from something beyond their capability: What sin had I committed in the previous life? They believe that there must be some reason for this hardship the reason why they don't know. Karma is usually paired with reincarnation. If there is no reincarnation, there is no karma. The hardship, the cause of which one can understand, is no karma. The essence of karma lies in the continuity of being beyond the lives by which one transforms oneself into another identity.

$a^1$  in the previous life is  $a^2$  in this life (Figure 2). What connection does the identity of  $a^1$  in the last life have with that of  $a^2$  in this life? Why should  $a^2$  pay the price of  $a^1$ ?

Accept the premise that the suffering in this life is due to the sin in the previous life and suffer the pain: is this the right way of living? Should we make redemption for the debt we can't remember whether we borrowed it or not? It is a mental pressure that makes us compensate for the sin, which is not directly linked to I as it is now in this life. Original sin in Christianity is something similar to this religious, psychological pressure. Humankind suffers the burden that Adam and Eve had made. Human being must suffer in this life or be born again spiritually to compensate for this original sin.

Karma forms a unique worldview by merging several factors: causality+action+feedback+reincarnation.

The unique karmic worldview begins with two categories (Figure 1):

Elements: actor( $a$ ), object of the action( $A$ ), the result of action( $B$ )

Function: action( $a \rightarrow A$ ), causality relation( $A \rightarrow B$ ), feedback of the result to the actor( $B \rightarrow a$ )



Figure 1: Simple causality triangle

$a$  is an actor (ego) who acts  $A$ , which results in  $B$ , and this  $B$  returns its effect to  $a$ . Action is feedbacked to the actor through causality, that is, cause and effect. Here  $A$  is the cause and  $B$  the effect. So this triangle shows the action of  $a$  and its result to  $a$ , and the cause-effect relation between  $A$  and  $B$ .

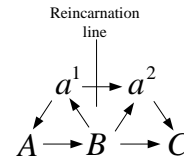


Figure 2: Causal reincarnation

When  $a^1$  transitioned to  $a^2$  in the next life, a more complicated causality appears.  $a^1$  died and is reborn as  $a^2$ , because he adheres to the physical world of  $A, B, C \dots$

$a^1 \rightarrow a^2$  transition (=reincarnation) is performed with the ontological identity of  $a^1 = a^2$ . Across the reincarnation line,  $a^2$  has the same identity as  $a^1$ , so that the result of  $B \rightarrow a^1$  is succeeded as the  $B \rightarrow a^2$ .  $a^2$  succeeded  $B$  as well as  $a^1$ . This reincarnative identity is karma.

$B$  is applied to  $a^2$ , because  $a^2$  is  $a^1$ . Stimulated by  $B$ ,  $a^2$  reacts, and produces  $C$ . This triangular relation  $B \rightarrow a^2 \rightarrow C$  is simplified as  $B \rightarrow C$ . So the  $A \rightarrow B \rightarrow C$  causality continues.

This process is based upon two structures: the causal triangle and the incarnative identity triangle.  $a^1 - A - B$  forms the causal triangle and  $B - a^1 - a^2$  forms the incarnative triangle. In the former,  $a^1$  is influenced by  $A \rightarrow B$  causality. In the latter,  $B$  is applied evenly to  $a^1$  and  $a^2$  on the ground that

$$a^1 = a^2 \therefore B \rightarrow a^1 = B \rightarrow a^2$$

Here by  $B$ , an existential transformation of  $a^1 \rightarrow a^2$  is mediated, and the action  $B \rightarrow a^2$  brings about the reaction  $a^2 \rightarrow C$ , which gives the casual process  $B \rightarrow C$ , which can be called karmic causality. And  $B \rightarrow a^2 \rightarrow C$  forms the karmic causality triangle.

This resulted in two processes: ontological continuity of the actor (ego),  $a^1 \rightarrow a^2 \rightarrow \dots \rightarrow a^n \rightarrow \dots$ , and the causal continuity of the object of the action  $A \rightarrow B \rightarrow \dots \rightarrow Z \rightarrow \dots$  (Figure 3).

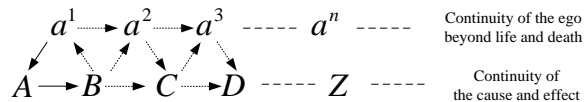


Figure 3: Truss structure of the karmic bridge

The truss has been traditionally thought to be the most robust bridge structure. The continuity of the ego line and that of the cause and effect line go side by side forever in Figure 3. This is the basic concept of karmic structure and process. In Figure 3, the truss of two triangles solidifies the karmic structure, from which only few can escape.

### 3 DECONSTRUCTION OF KARMA

How can we deconstruct this karmic truss? It lies in dismantling the process

and the structure of karma, in other words, in disassembling the triangles and, as a result, in removing the causality line and the ego line.

The first one, which is the removal of the causality, is basically the discontinuation of the reaction. The most effective response to nullify this cause-effect relation is to stop the reaction to the evil cause.

Jesus said that "You have heard that it was said, 'Eye for eye, and tooth for tooth.' But I tell you, do not resist an evil person. If anyone slaps you on the right cheek, turn to them the other cheek also (Matthew 5:38-39). This is not a masochistic behavior but a call for the cessation of the continuity of action and reaction based upon the egoistic causality, "by yourself."

He said again: "You have heard that it was said, 'Love your neighbor and hate your enemy.' But I tell you, love your enemies and pray for those who persecute you, (Matthew 5:43-45). The continuity of revenge brings about a vicious cycle in human society.

The second one regarding the removal of the ego line is the other aspect of the first one.  $a$  is bound to the causality of  $A \rightarrow B$ , because he expects  $B$ , which is the result of  $A$ . In the background of action and reaction exists ego. According to various religious scripts, such as Buddhist's or Hindu's, the feedback  $B \rightarrow a$  is said to be due to  $a$ 's adherence to  $B$  (Figure 1,2,3).  $B$  is feedbacked to  $A$  when  $a$  requires  $B$  as the result of  $A$ . Where there is ego, there is attachment to the result of an action. By expecting  $B$ ,  $a$  accepts the causality of  $A \rightarrow B$ , that is, the feedback from  $B$ . If  $a$  doesn't desire  $B$ , then causality does not function.  $a \rightarrow A$  is all. This is an orientational duty. There is no feedback  $B \rightarrow a$ .

Bhagavad Gita teaches the pursuit of pure action as its essential lesson, which can be expressed as below: Do your duty without expecting the reward for it. To attach to the result of the action is to damage the significance of the action in its pure form. If one attaches too much to the result of an action in the pursuit of ego-centric interest, he loses the significance of the action as a duty. Duty is not an investment for the ego's profit; it is a dedication to something beyond the ego. By performing duty beyond ego, you behave as the Absolute.

A dutiful action means a performance denying the spillover to the ego. Is there any action that ends in itself? One of the actions, which is not bound to the result of the action, is meditation practiced with the absolute orientation. Meditation means the orientation in general towards the Absolute, through which one is rerecognized. By this recognition, an orientational action that does not regress to oneself is possible in the consciousness as the act of Absolute, not ego. Therefore, meditation is said to be the best way of escaping from karmic life and the ultimate expression of dharma. Meditation brings about the collapse of the ego, and the equality of 'I = other' appears in the orientation towards the Absolute.

Thirdly, karmic destruction may be possible by fully experiencing karma, which can be called karmic justice.

As was said previously, karma begins with the action. Here the

characteristics of karma include the process of the feedback of the result to the actor. One's action necessarily returned to oneself: this is the karmic causality. The problem is that this consequence of the action is applied to a person (ego) beyond life and death. If the consequence is happiness, that's good, but if it were hardship, then the ego suffers without knowing the reason why.

Let's suppose one ( $a^1$ ) goes through  $A \rightarrow B \rightarrow C$  with the identity of  $a^2$  in the next life (Figure 3). He who did  $A$  is reborn with  $B$ , and suffers from the painful reality  $B$ . He, who cannot understand the causality  $A \rightarrow B$ , shouts 'why?'. This 'why?' is karmic fate.

The name of the game through incarnation is karma, and the rule of the game is that the actor must accept his own action's result, which he doesn't know the meaning of why beyond life and death, therefore beyond his understanding. The action was free, but the result is binding.

Then should all the hardships in this world be justified?

What he did to others returns to himself. In effect, he did it to himself. Other's suffering cannot be felt unless he himself becomes that other. He himself, who became that other through reincarnation, experiences that feeling, not knowing the reason why. If the state in this world is the result of the action in the previous life, then this state is justified as it is, and there is no need to sympathize with the suffering, and one should accept one's suffering as it is.

Is this the realization of justice beyond life and death? Or a dextrous trick of God to make us feel the same feeling that we made others feel in our previous lives. Through the indifferent viewing of one's suffering, just like others', we can get out of that suffering. Then we may conclude that karma's significance lies in the realization of justice beyond life and death

In that sense, karma is dharma, dharma is karma, and the meaning of life lies in enjoying the game of karma through repeated reincarnation.

#### 4 FROM KARMA TO DHARMA

There are two ways of living; karmic and dharmic (Table 1), in other words, causal or orientational. About karma, much has been said in the previous part. The dharmic way of living is the antithesis of the karmic way.

**Table 1. Characteristics of karma and dharma**

	Ontological characteristic	Motivation of action	Principle of behavior	Behavioral characteristic	Geometrical characteristic
Karma	ego-centric	ego-centric interest	causal	attachment	triangular causality
Dharma	Self-centric	duty	teleological	orientational	linear

The essence of dharma lies in orientation. The orientation means being apart from ego-centric existence. Karma is causal, dharma is teleological and orientational. Dharmic action is done by deciding the deed based upon the fundamental value criteria, which makes the actor free from the result of the

action. This can be interpreted that if one is free from oneself, then he is freed from the result of his action.

In  $a \rightarrow A$ , dharma has the mono-linear relationship between the actor  $a$  and its orientational purpose  $A$  (Figure 1). Here  $A$  is for  $A$ , whereas in karmic triangular structure,  $A$  is for  $B$ .  $A$  is relativized to  $B$ .  $a$  has the direct object  $A$  and indirect object  $B$ .  $B$  is the purpose of  $A$  and at the same time the result of  $A$ . This mixed and complicated relation between  $a$  and  $B$  by way of  $A$  makes  $a$  attached to  $B$ , and  $B$  rules  $a$ . The unfulfilled desire of  $a^1$  is attached to  $a^2$  in the next life.

You reap as you sow the seed. This is a universal truth. If you follow dharma in the original cause, receive the dharmic result. The dharmic orientation of sowing the seed brings about salvation from karma. Karma is the result of a dharmic response to the individual, egoistic claims which despise the universality.

$$A \rightarrow B$$

If  $A$  is dharmic, then  $B$  is happiness. If  $A$  is ego-centric, then  $B$  is unhappiness. Karma and dharma are closely related. Dharma functions as the cause setting of karma. We are asked every moment: Self-centered life or ego-centered life? An orientational act of a causal act?

We can do the cause but cannot control the result. The result is decided following the cause, and we cannot but accept it. That's why the righteousness of the cause is salvation. The idea that the best way to get out of hardship is to get out of the ego, to where the hardship returns, is logical and fundamental and rational or even utilitarian.

The universal expression of karma is dharma. The individual application of dharma is karma. So that the universal orientation beyond individuality is the dharma of overcoming karma. It's a matter of the whole or the individual.

Karmic law is applied mathematically beyond life and death, which is a mystical ontology. Reincarnation is the ultimate expression of ontology. When the causality continues with reincarnation, it is transformed into ontological issues from logical, epistemological issues. Therefore, the karmic idea resulted in the question 'who am I?'. Karmic shout 'why am I suffering?' is, in turn, transformed into 'who am I that is suffering?' and beyond  $a^1$  and  $a^2$ , an approach towards the real Self begins. This transformation of question from 'why?' to 'who?' is the dramatic turning point in the long journey of karma because the wanderer in the darkness asked the right question to be answered, that is, the right step towards the light. At last, reincarnation begins to lose its significance<sup>2</sup>.

<sup>2</sup> Ramana Maharshi says: the body is born again and again. We wrongly identify ourselves with the body, and hence imagine we are reincarnated constantly. No. We must identify ourselves with the true Self. The Realised One enjoys unbroken consciousness, never broken by death — how can he die? — or by birth. Only those who think 'I am the body' talk of reincarnation. To those who know "I am the Self" there is no rebirth. Reincarnations exist only so long as there is ignorance. There is no incarnation,

## 5 CONCLUSION: THE SUN AND THE SHADOW

Overcoming ego by turning to the right direction is the essence of dharmic life.

When you have the sun at your back, you see the shadow of yourself. And you find it impossible to erase your shadow on the ground. The body is ego, and the sun is dharma. The shadow is the reflection of the ego appearing when you defy the sun. Shadow is pain and hardship. Shadow is karma. To see the dark side of ego is suffering.

Being against the sun visualizes the dark side of ego, and however hard we try to erase it, it does not disappear. The only way to erase it is to orientate the sun again. The sun is dharma, the righteous direction. The shadow disappears of itself. The ontological orientation deletes the epistemological shadow. Orientation to dharma makes karma disappear naturally. The shadow itself ceases to exist. Therefore the direction is the ultimate solution. When one resolves to stand up from the shadow and proceed to the sun, darkness dissolves.

We can make some analogical interpretations of karmic or dharmic action in relation to the international order and human society. Therefore, overcoming a small ego for the universal Self can be adapted to international society. We are witnessing continuous action, revenge, and reaction, due to the historical and political causality. We must get out of this international karma attributed to the national ego towards the global dharma. Right direction from ego to Self, this will put an end to the karma of humankind, individually, socially, and globally.

And it goes without saying that dharmic orientation is the essence of education, which can be applied to children as well as adults.

Until the 16<sup>th</sup> century, Ptolemaic theory prevailed. According to that, the sun moves around the earth. This planetary ego was justified by religious belief. And then heliocentrism proved to be true. Not that the sun (Self) turns around the earth (ego), but that the earth (ego) turns around the sun (Dharma); this Copernican turn must be introduced to our lives to overcome the karmic bondage.

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either now, before or hereafter. This is the truth (Talk 363) [1].

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