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Gediminas Beresnevičius

EDUCATIONAL DIMENSIONS OF  
CREATIVITY AND CREATIVE THINKING

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ŠIAULIŲ UNIVERSITETAS

Gediminas Beresnevičius

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## INTRODUCTION

Creative work, efficient problem solving using various creative thinking methods and development of creativity are undoubtedly relevant in today's post-industrial knowledge and information age. A creative personality is a great value not only in the area of art, science or technology but also in business, education, management, politics and elsewhere. Ability to make creative decisions and adapt to constantly changing conditions are of utmost importance in rapidly changing society. Increasingly acute competition in the world, depleting natural resources, recurring economical crises, growing ecological and other issues raise augmentative challenges to the modern generation.

J. P. Guilford (1968), one of the most distinguished psychologists, noted that creativity is a key to full-fledged education and solution to the most important problems of mankind. "Creativity is a driver of innovations and a decisive factor of personal, professional, entrepreneurship and social skills as well as the whole societal well-being", – it is stated in the webpage of European Creativity and Innovations (European Year of Creativity and Innovation 2009, 2009).

The year 2009 was announced as the Year of Creativity in the European Union. This fostered personal and organisational creativity and innovations. Those countries where creative societies have been formed have the highest economical and political perspectives (Florida, 2005). Lisbon European Council meeting in 2000 emphasised that "people are Europe's main asset and should be the focal point of the Union's policies" (National Lisbon strategy implementation programme, 2005).

Dispositions of the Lithuanian State Education Strategy for 2003–2012 (2003, p. 2) affirm that "strengthening Lithuanian position in the Western area its education has to help foster societal creative powers". To implement this disposition scientific research into various manifestations of creative work are necessary, which would form the foundation in formulating practical recommendations for teachers who develop learner creativity or create conditions for children to express their creativity. According to Lee Yuan Tseh, a Nobel prize winner, the development of creativity still lacks sufficient attention (Kilgour, 2006).

Creative work, person's creative skills, creative personality, creative solution of difficult problems are significant research areas. What is creative work? What can be considered a piece of art? Why do people create? What is a creative personality? What is happening in the brains during the process of creativity? Thinkers have been concerned with these and similar questions for

more than one century. The majority of works analysing creativity and its aspects were performed in the 20<sup>th</sup> century, whereas the most intensive research into creativity has been evident during the last 50 years.

Researchers whose works have formed the contemporary concept of creativity and creative thinking are as follows: T. Amabile (1985, 1983, 1996, 2001), R. Cattell (1963, 1965), A. Cropley (1999, 2006), M. Csikszentmihalyi (1976, 1996), K. Duncker (1935, 1945), J. Guilford (1950, 1959, 1968), J. Hadamard (1954), J. Horn (1967, 1968), K. Jung (1946), A. Koestler (1964), A. Maslow (2006), A. Newell (1981), T. Ribot (1906), M. Runco (1995, 2004), D. Simonton (1975, 1988, 1990, 1999), R. Sternberg (1985a, 1985b, 1986, 1990, 1995, 1999, 2005, 2006), C. Taylor (1963, 1964, 1988), E. Torrance (1962, 1964, 1986, 1987), L. Vygotsky (1999), G. Wallas (1926), Я. Пономарев (1960, 1976, 1999, 2006).

Some researchers investigated creativity as a certain quality of intellect (Cattell, 1963, 1965; Cropley, 1999, 2006; Cropley, D., Cropley, A. 2000; Duncker, 1935, 1945; Guilford, 1950, 1959, 1968; Horn, 1967, 1968; Sternberg, 1985a, 1985b, 1986, 1990, 1995, 1996, 1999, 2005, 2006; Torrance, 1962, 1964, 1986, 1987; Пономарев, 1960, 1976, 1999, 2006). Others researched creativity as a peculiarity of personality (Jung, 1946; Koestler, 1964; Jovaiša, 2007, Maslow, 2006), whereas others created their own educational systems of developing creative thinking (Altshuller, 1985; Альтшуллер, 1985, 2009; de Bono, 1992a, 1992b, 2008; Gordon, 1961; Osborn, 1953).

During the past decades creativity has attracted immense scholar attention (Akinola, Wendy, 2008; Asmus, James, 2005; Austin, 2009; Baer et al, 2008; Baille, 2002; Beghetto, 2009; Caroff, X., Besancon, M., 2008; Chenfeld, 2002; Cortello, 2005; Dreyfus, 2009; Fodor, Laird, 2004; Goldstein, 2009; Griskevicius, Cialdini, Kenrick, 2006; Halpern, 2003; Harrison, 2009; Hemlin, Allwood, Martin, 2008; Hunter et al, 2008; Jalongo, 2003; Jaskyte, Taylor, Smariga, 2009; Jonathan, Lubinski, Benbow, 2005; Kozak, Weylin, Viswanathan, Wegner, 2008; Levine, Perlovsky, 2008; Levy, Anderson, 2006; Lubart, 2009; Mann, Baille, Dewulf, 2000; Matthew, 2009; Memmert, Perl, 2009; Middleton, 2005; Miller, 2001; Moneta, Siu, 2002; Nelson, Rawlings, 2009; Nijstad, 2006; Oon-Seng, 2006; Patera, Draper, Naef, 2008; Paul, Elder, 2006; Pretz, Link, 2008; Prigogine, 2006; Renzulli, 2003; Rumpite, 2008; Sattler, Hoge 2006; Shahrin, et al, 2002; Smith, 2008; Ward, 2008; Wheeler, Waite, Bromfield, 2002 and others).

Creativity was also researched in Lithuania though at a narrower scope than in the Western countries (Almonaitienė, 1997, 2000; Beresnevičienė, 1995, 1996; Beresnevičienė, Beresnevičius, Bardinskienė, Gumuliauskienė,

2007; Bižys, Linkaitytė, Valiuškevičiūtė, 1996; Butkienė, Kepalaitė, 1996; Grakauskaitė-Karkockienė, 2002, 2006a, 2006b; Gučas, 1959; Jacikevičius, 1995; Jonynienė, 1987; Jovaiša, 2002; 2007; Juodaitytė, 2002; Petrulytė, 2001 and others). Irrespective of immense interest and abundance of publications the expression of creativity is still an enigmatic phenomenon.

#### **Theoretical relevance of the research**

Both in Lithuanian and abroad there is a great lack of scientific research works devoted to the evaluation of the creativity issue: 1) in education science, there exists an immense confusion of concepts: "creative work", "creativity", "creative thinking", 2) educational dimensions of creativity and their mutual links have almost been not researched; 3) there is absence of universally accepted methodologies for creative thinking evaluation, 4) there is shortage of research into the change in learner and teacher creative thinking in ontogenesis, 5) the correlation between the peculiarities of creative thinking and time spent on watching television, playing computer games and reading books has not been researched in Lithuania.

#### **Practical relevance of the research**

The policy of the European Union and contemporary crisis situation in Lithuania, which is peculiar of rapid political, economic and social changes, determine the assessment of creativity as the driver of innovations and a decisive factor in personal, professional, entrepreneurship, social skill development, solving economic, political and educational problems and a factor of well-being of the whole human society (European Year of Creativity and Innovation 2009). Therefore, it is necessary to develop creativity and teach children to think creatively – this is noted by the world leaders and heads of education.

At present there has been a disposition in the world policy that those countries will have the greatest economic potential in the future where creative employees will make up the larger part of the society (more than 30%) (Florida, 2005). Therefore, educationalists and teachers have to develop creative personality and create conditions for human creativity to mature.

Implementing the *European Community Lisbon programme which aims at training entrepreneurship based thinking and the main constituent of which is creative thinking*, it is important to research features that foster or hinder the development of creative thinking. Developing and teaching the prospective employer (activity leader), it is essential to understand the model of creative work process and research educational assumptions of prospective businessman, employer (activity leader) creativity development and self-development at various developmental stages: foster the needs and forms of training creative thinking, teaching and learning strategies, means of

developing environment, favourable for the leader in lifelong learning by educating and teaching their educators and developing lifelong learning measures significant to activity leaders, analysing educational mistakes prevailing in Lithuania up to now.

In Lithuania, educators, teachers and teacher psychologists, lack methodologies prepared to assess creating thinking, thus possibilities to measure the efficiency of the provided creative thinking training suffer. All participants of education system should be aware of the means and measures of learner creativity development as well as factors that help or hinder this development.

**Research object:** the process of creativity and creative thinking which proceeds due to psychological, social, physical and other factors.

**Research purpose:** to identify educational dimensions of creativity and creative thinking on theoretical and empirical levels.

**Hypotheses:**

1. It is expected that originality of creative thinking reaches its maximum in senior age adolescence (around 18 years of age), then it decreases.

2. It is expected that there exists a positive correlation between the parameters of creative thinking (abundance of ideas, flexibility, originality) and personality's interest in science and art.

**Research objectives:**

1. To analyse the concept of creativity and creative thinking, factors affecting creativity and research into creative thinking.

2. To specify the concept "creativity".

3. Having analysed the scientific literature to design a component and dynamic models of a creative process.

4. To analyse the development of creative thinking in its ontogenesis.

5. To compare the parameters of creative thinking (abundance of ideas, flexibility, originality) in groups according to gender, birth order, place of residence and learning progress.

6. To identify correlations between the parameters of creative thinking and other personality creativity dimensions (learner interest in science and art, self-esteem, psychological well-being, value orientations).

7. To identify correlations between the parameters of creative thinking (abundance of ideas, flexibility, originality) and self-education needs (time spent on learner self-education by reading books, watching television, conferencing with friends on-line and playing computer games), need to attend creative thinking training clubs, peculiarities of will for independent work (time spent to prepare homework) and overcoming learning difficulties.

8. To design recommendations to policy makers and teachers on the basis



of the theoretical and empirical findings of the dissertation.

**Methodological basis of the research.**

1. The research is based on a scientific-structural principle of research methodology: the concept of creativity is defined making a distinction from semantically close concepts (creative work, creative thinking, creative work product, and etc.) and, having summarised research literature, theoretical component and dynamic models of the creative process are designed.

2. The research is based on the educational philosophy conception by L. Jovaiša (2007) which asserts that “education is human communication which creates personality in interaction with environment and values of human culture. Education is the most general category of pedagogy which includes growing, educating, teaching, training, upbringing, formation” (Jovaiša, 2007, p. 311), whereas sustainable education is a concept of education philosophy “reflecting approach to education as a long-term process which starts from birth and continues throughout life, i.e. includes all stages of life (age periods) and forms of education and teaching” (Jovaiša, 2007, p. 181)

3. The research is based on the concept interpretation made by L. Jovaiša asserting that creativity is “a set of personality features, which by productive work allows to achieve original qualitatively new activity results significant for the society“ (Jovaiša, 2007, p. 127).

4. The dissertation research is based on the holistic personality structure theory created by L. Jovaiša (1999, 2001), which merges different methodological schools (trait and factor theory, personality active participation theory, cognitive theory and dynamic theories). Holistic personality structure of the educational theory by L. Jovaiša consists of active participation block, skill block, character block and motivation block.

5. The research has its foundation in humanistic psychology methodology, where it is stated that creativity is a trait of personality who aims at self-realisation and that self-realising personality “attempts to find new ways rather than following safe pathways well-trodden by others” (Maslow, 2006).

6. The research is based on fully-functioning personality theory (Rogers, 2005). Only a free and creative personality who aims at self-expression and is open to experience can be a fully functioning personality able to accept himself and others in the way they actually are. Only taking into account what is happening “here and now”, it is possible to hear one’s real needs and desires, one’s inner voice and aim at satisfying the needs of one’s creativity, self-expression and freedom to learn.

7. The research is also grounded in phenomenological education theory. C. Rogers (2005) emphasised the uniqueness of an individual and freedom to choose how to behave; his behaviour is determined neither by his response to

the powers of subconsciousness, as stated by Freud, neither by external stimuli, as stated by behaviourists, but depends on individual's perception, understanding and interpretation of external world. No one in the world can know our perception but only we ourselves, therefore it is us who are the best experts. It is the individual's perception of the present moment situation, its interpretation and experience of what we see and feel "here and now" that is of particular significance.

As claimed by Rogers (2005), human behaviour is determined by person's subjective world, his *phenomenological reality* is more important than the physical world. It is how people interpret things that is actual reality, therefore he calls the concept of self-evaluation – the evaluation of himself – to be the most important educational dimension of personality.

**Research stages:**

**Stage 1.** Analysis of scientific literature and preparation of theoretical component and dynamic model of creativity process. Definition of the concepts of "creativity", "creative thinking", "creative work".

**Stage 2.** Identification of creativity research parameters. Selection of creative thinking research methods. Designing of questionnaires for learners and teachers researching personality traits (self-assessment, interests, psychological well-being, learning motives, value orientations) and self-education, participation in non-formal and informal education.

**Stage 3.** Research into learner and teacher creativity dimensions using a questionnaire and two tests designed by E. E. Туник (2002) to evaluate creativity parameters. The research was performed in 2008-2009. 655 research participants took part in the research: 601 5<sup>th</sup>-11<sup>th</sup> form school learners and 54 teachers from Eišiškės, Kaunas, Panevėžys, Šalčininkai and Vilnius schools (random sampling).

**Stage 4.** Statistical analysis of research data. Writing conclusions. Designing recommendations for teachers and education executives on creativity development.

**Research methods:** 1. *Scientific literature analysis*. 2. *Questionnaire survey*. A questionnaire was prepared to research learner and teacher personality traits (self-esteem, interests, psychological well-being, learning motives, value orientations) and research participants' social-demographic data. The questionnaire was prepared on the basis of a monograph by D. Beresnevičienė (1995). 3. *Testing*. E. E. Туник's (2002) test on creative thinking was used. 4. Statistical analysis was performed by statistical information processing programme packet SPSS (*Statistical Package for the Social Science*) version 14.0.

**Scientific novelty and theoretical significance**

- The concept of “creativity” specified;
- Educational dimensions of creativity distinguished;
- Interface between dimensions of creativity researched;
- Dynamic model of creativity process designed;
- Component model of creativity process designed;
- Change in creative thinking determined in its ontogenesis (from 11 to 62 years of age);
- Peculiarities of Lithuanian school children’s creative thinking revealed (originality, flexibility of thinking, abundance of ideas) in groups according to age, birth order, learning progress and place of residence.

**Practical significance of the research**

On the basis of the research, methodology of learner creative thinking and its parameter (originality, flexibility of thinking, abundance of ideas) assessment was prepared for Lithuanian 5<sup>th</sup>-11<sup>th</sup> form learners and senior adult age teachers. The work revealed the importance of personality creativity educational dimensions (value orientations, interests in science and art, self-esteem, psychological well-being, needs for self-education and creativity) for learner creative thinking training. Dissertation also determined a negative impact of non-formal adult education (television, computer games) upon learner creative thinking parameters and a positive impact of self-education (independent reading of books) and value orientations upon the development of creativity.

**The structure of the dissertation.** Dissertation consists of Introduction, Overview of literature (11 chapters), Methodology of empirical research (3 chapters), Research findings (4 chapters), Discussion of findings, Conclusions, Recommendations, References and Annexes (3 annexes on a CD). The dissertation has 15 figures and 68 tables (42 in the text of the dissertation, and 26 in Annexes). The total volume of the dissertation: 168 pages (without annexes). The list of References consists of 352 sources.

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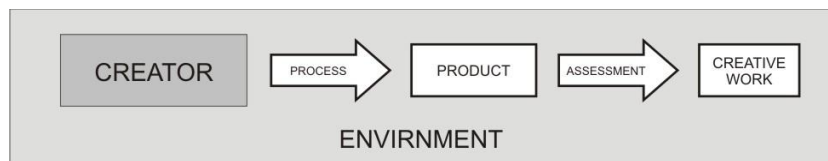
The introduction to the dissertation substantiates the relevance of the topics and research problem, defines the research object, purpose and objectives, explains theoretical and methodological approaches to the research, presents the research methods applied, reveals the scientific novelty and practical significance of the research.

### **1. OVERVIEW OF SCIENTIFIC LITERATURE AND MODELLING OF CREATIVITY PROCESSES**

#### **1.1. Key concepts used in research**

We consider *creativity phenomenon* to be the entirety (continuum) of transcendental and immanent phenomena related to such psychic and physical human activity which results in new (original) products: material objects or ideal constructs, described as artistic, creative, extraordinary, having historical, sustainable or other value and affecting society or separate

individuals immensely. Creative activity is always performed in a certain historical, social, cultural environment, which affects the creator, his activity (creativity process), assessment of the product and the created product itself. Therefore, the main elements of the creativity phenomenon can be illustrated by a scheme presented in Figure 1.



**Fig. 1. Main elements of creativity process**

*Creator* is a subject who creates new, original material and spiritual values. In this work, we use the interpretation of creativity formulated by L. Jovaiša who states that *creativity* is “a set of important personality traits which by productive work allows to achieve original qualitatively new outcomes of activity, important for the whole society” (Jovaiša, 2007, p. 127). The concept of creativity is specified in the dissertation linking L. Jovaiša’s (2001, 2007) theory and personality theories by humanists A. Maslow (2006) and C. Rogers (2005). On the basis of the mentioned above theories, creativity can be defined via educational dimensions asserting that *creativity* is a set of personality features comprised of thinking abilities, interests in science and art, value orientations, psychological well-being while learning, needs for creativity and self-education, will for independent work, self-esteem and perception of the meaning of creation which results in achieving original qualitatively new activity results through productive work.

*Creative thinking* is the highest form of productive thinking (Jovaiša, 2007). During this process new ideas, conceptions, collateral associations, unexpected links between the existing ideas, efficient solutions to problems and other original and valuable things are created. *Creative work* is “human’s activity in which new material or spiritual values are created that have societal importance” (Jovaiša, 2007, p. 127). All results of an individual, group of people or organisation’s activity are defined in this work as *a product*: ideas, projects, behaviour, things, and etc. The main requirement for *creative work* is novelty or originality and it should be appropriate, acceptable or valuable (Kilgour, 2006). *Environment* is the entirety of social, cultural psychological, ethical, physical and other factors. All these factors have impact upon the creator and also affect the process of creativity and its

result. The creator and the actions performed by him, and the creation itself in their turn change environment.

### **1.2. Scientific research into phenomenon of creativity**

Creativity phenomenon is researched by behaviouristic, social and cognitive psychologies, education science, philosophy, history, economics, management, cybernetics and a number of other sciences. The research includes manifestations of creativity in everyday human activity, artistic, scientific, engineer and other creativity, and also creativity of animal and artificial mind. The phenomenon of creativity is researched analysing cases of creators' lives, their biographies, involving creator introspective observations, laboratory tests, observing their creative activity, simulating problem situations, performing experiments, using computer modelling, and etc. Cognitive, motivational, processual and other aspects of creativity phenomenon are researched. Interfaces of creativity, traits of creative personality, creativity products and the process itself are researched. All studies of creativity can be grouped into 5 categories: psychometric, experimental, biographical, hystoriometrical and biometrical (Plucker, Renzulli, 1999). Alongside the theoretical search there is abundance of practical cases of application of creativity theories and methods.

### **1.3. Treatment of creativity concept in research literature**

There is still no universally accepted definition of the "creativity" concept in scientific research literature. Each concept includes one or another aspects of creativity and can be treated as partly right. The definition of creativity concept depends on which area of creativity is explored, where the emphasis is placed and which psychological or philosophical conception the researcher is guided by. According to J. P. Guilford (1959), one of the most famous researchers in this field, the term creativity can describe human thoughts, ideas, decisions, behaviour which can also be characterised by the terms "abundance", "flexibility", "originality", "particularity".

### **1.4. Traits, features and peculiarities of creative personality**

The research showed that creative personality traits are treated differently by various authors, and that it is impossible to discern one personality feature that could distinguish creative people from non-creative. From the cognitive point of view intellectual skills, knowledge, thinking style and internal motivation are discerned. Other authors stress the importance of self-esteem, emotional intellect, the necessity of brevity, flexibility of thinking. Yet other researchers suggest distinguishing creative personalities having a potential to create from people creating creative products. Different variants are suggested in scientific literature to categorise creative personalities into certain groups or types.

### **1.5. Creative thinking**

Creative thinking is the highest form of productive thinking (Jovaiša, 2007). Creative thinking is mostly related to the concept of divergent thinking by J. Guilford (1950, 1959, 1968). Divergent thinking embraces such verbal and non-verbal dimensions of thinking as abundance of ideas, flexibility of thinking, originality, particularity. Researchers note that problem solving also involves convergent thinking, which is opposite to divergent thinking and helps to find a solution suitable for each concrete case. Though plenty sources about creative thinking have been written still there are a number unanswered questions.

### **1.6. Relationship between creativity and intellect**

The correlation between creativity and intellect is complicated and dependence of creativity on intellect estimation size is not linear. High creativity level requires not lower than 120 intellect coefficient (IQ). Having reached this level of intellect coefficient, its further growth, expansion, for instance up to IQ=150, has no impact upon creativity potential; but when the level of intellect is extremely high, for instance, IQ is from 170 to 180, it already hinders creativity in the same way as insufficiently high level of intellect.

### **1.7. Factors affecting creativity process**

Ontogenetic research shows that creativity reaches its peak in adolescence and then decreases with age. The dependence of maximum of creativity on age is also related to the area of creativity: there are areas when mature and significant works are created at the very late age. The changing intellect (related with creative thinking and creativity), discerned by R. Cattell (1963, 1965) and J. Horn (1967, 1968), achieves its peak in adolescence and then decreases. Both too small and too large amount of knowledge can hinder the search for solution to problems and at the same time the process of creative thinking. Creative imagination is essential in any process of creativity. Emotions are also an important factor in the process of creativity. During the process of creativity twofold emotions are aroused. Emotions regulate the process of problem solving.

### **1.8. Problem solving process**

Creativity is often related to the ability to solve problems. Problem solving is researched in the scientific research literature as part of thinking. If problem solution is adequate to the criteria of creation, problem solving (as a process) can be considered to be creative thinking. Problem solving is the most complicated function of intellect. It is defined as a cognitive process which requires to apply and control core skills that are used more rarely (Goldstein & Levin, 1987).



The model of creative thinking process was first presented by G. Wallas (1926). The author divided the procedure of problem solving into 5 stages: 1. Preparation (the creator prepares to solve a problem and consciously researches problem dimensions). 2. Incubation (problem solving is transferred to subconsciousness). 3. Understanding (the person has a feeling that solution is nearby). 4. Illumination or insight (creative idea thrusts its way from subconsciousness to consciousness). 5. Verification (the idea is verified, expanded and later applied). A number of scientists adopted and modified this model of creative thinking by G. Wallas (1926).

#### **1.9. Problem solving strategies, methods, heuristics, techniques, algorithms**

Aiming at making the process of creativity more rapid, a great number of various sets of methods or so called heuristics were created during the last century, based on the assumption that a human being is creative from the very nature and it is necessary to find ways and methods for this creativity to emerge. The methods facilitate the process of creativity, stimulate person's mental powers and help to overcome psychological barriers. The most well-known sets of methods are as follows: brainstorming, sinectics, lateral thinking, six thinking hats, a checklist method. The "policy" of these methods is to find as many new ideas as possible and later to select most appropriate. The advocates of algorithmic methods support the opposite strategy. Problem solving algorithms are created on the basis of the analysis of a great number of solutions to real problems.

#### **1.10. Product of creative activity and its assessment**

Creation is an activity product adequate to the set requirements. The result of creativity is assessed from the point of different approaches: equity, suitability, usefulness, applicability, and etc. Aesthetical, artistic, scientific, technical and other criteria are applied to the designed product. The created product can be assessed by the creator himself, by his colleagues, specialists, experts, consumers. The assessment is affected by time, cultural media, social environment, economic situation and other factors (Anderson, Heather, 2005; Runco, 2004). The main requirements set to the product are novelty (originality) and suitability (adequacy to requirements set in this activity area). The value of the created product depends on a number assessment criteria, factors, settings. and etc. The product's value changes depending on the times, advancement of science, technologies and art. The products of creativity can be distinguished into certain levels.

#### **1.11. Models of creativity and creative thinking**

There is abundance of theoretical models of creative thinking and the process of creativity in scientific literature resources. The structure of a

model, its particularity and other parameters depend on the author's conception, the chosen approach and which aspects of creativity are aimed at revealing.

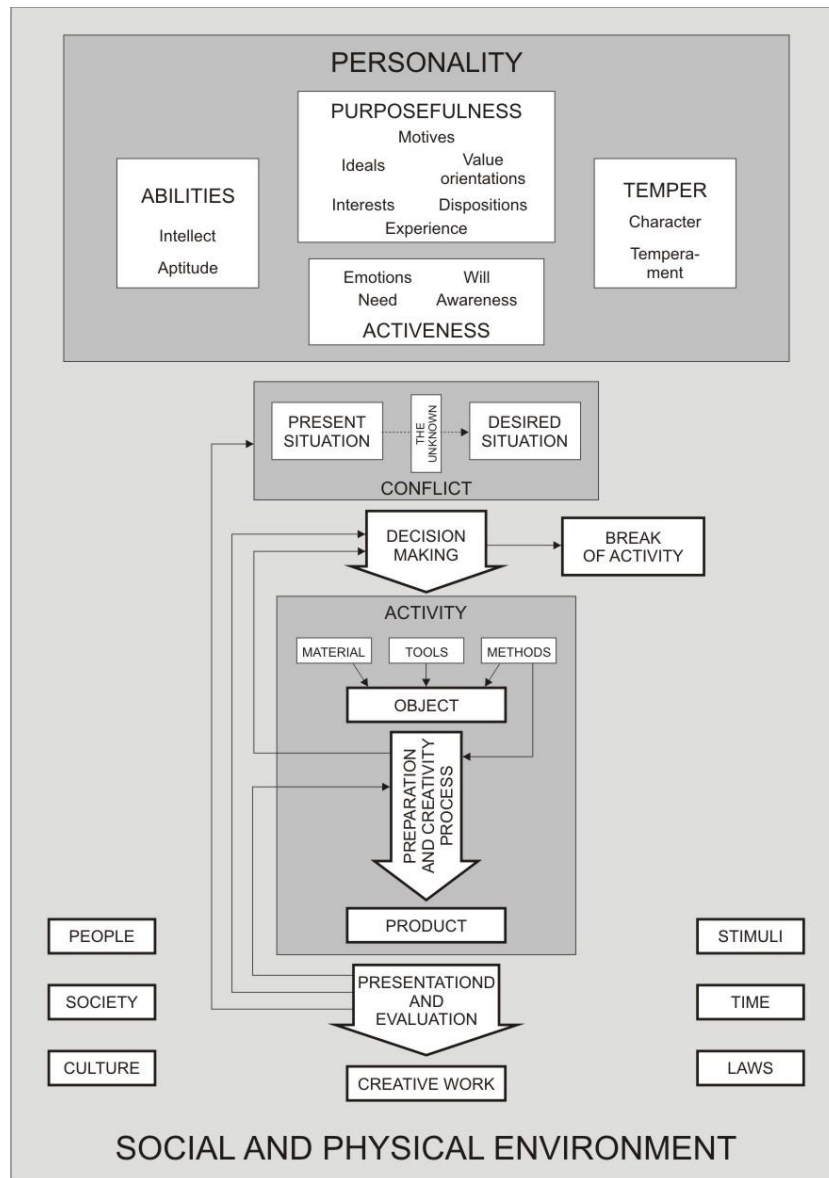
#### 1.11.1. Models of creativity and creative thinking by different authors

*Associative* model explains how new knowledge and experience emerge; *Information* conception describes symbolic systems that thinking process operates on, how the heuristics of goals and means functions applying operators which shorten the distance between the starting point and the goal; in *Search field* models heuristics is understood as narrowing the field of problem solution search; in *Teleonomic* model A. Pudmenzky (2004) presents links between creativity and such phenomena as mistakes, (pseudo-) serendipity, humour, madness and analogy making; the interface between logics and intuition is described by Я. Пономарев (1960, 1976, 1999) in the model of psychological creativity mechanism; *structural-dynamic* theory (Ушаков, 2006) is based on the idea that laws of development and formation of the psychic system are more common and prior to laws of functionality; the interaction between problem, person, process and product is explored by *4P* model (*Problem – Person – Process – Product*); *Holistic* models embrace a number of factors underlying the process of creativity.

#### 1.11.2. Component creativity process model

Component creativity process models present essential structural components (traits of the creator, abilities, features, processes, circumstances), interacting during the creativity process and determining the success of creativity (Lubart, 1999).

On the basis of the scientific literature overview a component creativity process model was designed (see Fig. 2).

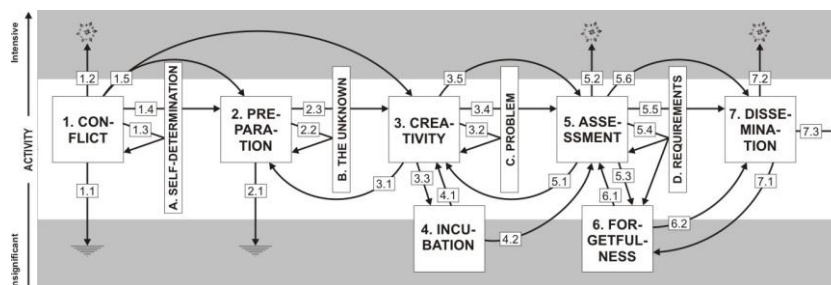


**Fig. 2. Component creativity process model**

*Personality* is an essential component of the model. Personality structure consists of blocks described in L. Jovaiša's (2001) theory: active participation, purposefulness, abilities and temper. The entirety of personality factors and interaction with environment determine the dissemination of creativity, the procedure of creativity process and its final result. Creativity process proceeds in a certain *social and physical environment*, therefore, the creator and the whole creativity process is enhanced, hindered or impacted in any other way by various factors of the environment. Creator's internal *conflict* appears in the interaction between the personality and environment, i.e. psychological tension within the creator (Jovaiša, 2007), which arises due to the contradiction between the present and desired situation and underlies the outset of the creativity process. It is a creative problem – the path through the barrier of the Unknown to the desired situation. During the *Decision making* stage the person decides what to do when the internal conflict arises: to undertake a creative activity or not. The decision making is affected by various motives, emotions, impact of the environment and other factors. If the intended result is not reached the creator can return to this stage of activity or break the creative activity at all. Using diverse *material*, applying known *methods* and affecting the chosen *object* by appropriate *tools*, during the *preparation* and *creativity* process the creator obtains the *product* – the outcome of his activity. A *presented* and properly *evaluated* the product is considered a *creative work*. There exists mutual interaction between all the components of the model. A brighter and clearer impact of some components upon others is illustrated in the model by arrows.

### 1.11.3. Dynamic creativity process model

We created the dynamic model of the creativity process on the basis of the performed scientific literature research. The model presents creativity process stages, barriers, alternatives of creator choices and actions (see Fig. 3).



**Fig. 3. Dynamic creativity process model**

The creativity process model is illustrated in relative activity participation scale (from insignificant to intensive). Creativity process *stages* (1 to 7) are divided by internal and external *barriers* (A, B, C, D) on the way to achieve the goal. It is necessary to have enough energy and put efforts in order to overcome the barrier. The arrows with numbers in the model illustrate the actions of the creator and people around him, choice alternatives, opportunities, consequences, ways out, transition from one stage to another.

The outset of the creativity process is conditioned by a *conflict* – psychological tension in creator’s mind (Jovaiša, 2007), which arises due to the present and intended situations. The barrier which was symbolically called “*self-determination*” hinders the choice of creative activity by transforming the conflict energy to the creativity process. In the stage of *preparation*, the creator prepares for the process of creativity: selects information, formulates goals, designs an action plan and chooses a strategy. Various psychological obstacles or the barrier of the *Unknown* hinder the start of the creativity process. During the *creativity* stage, the aim, plan and set objectives are implemented, created, solution to problems is searched for and the created product and ideas, solutions are developed. The completion of the creation, in order to present it to consumers, critics, assessors, is hindered by the barrier caused by the *problem* itself. Having searched for a proper solution for a long time, the activity breaks at this area of creativity and the stage of *Incubation* can start. In the *assessment* stage the product is assessed and the solution is verified. In the long run or under the changed circumstances assessment also changes. During the assessment the decision is made if the activity product is adequate to the set requirements. If it is the product is recognised as a creative work of a certain level. Thus for a product to become a creative work it is necessary to overcome the *Requirement* barrier. The creative work can be forgotten for a certain period of time or known only to an in-group and inaccessible to the society (stored in special repositories or private collections). It is the *dissemination* of the creative work that its accessibility to the consumer, utilitarian and other value depends on.

#### **1.12. Creativity education and enhancement of creative activity**

Can creativity be trained or is it an inborn trait? It is one of essential questions in creativity education theory and practice. There are authors who state that creativity cannot be trained, for instance, R. Cattell (1963) and J. Horn (1967). Other scientists maintain the opposite opinion stating that creativity can be developed. This approach is maintained by E. Torrance (1986) and a number of other researchers. The main groups of creative dissemination means are as follows: 1. Creative environment and creating favourable conditions for creative work. 2. Support in becoming aware of

one's creative powers and barriers. 3. Methods, heuristics, special programmes that develop creativity and train creative thinking.

## **2. METHODOLOGY AND METHODS OF EMPIRICAL RESEARCH**

### **2.1. Research participants**

655 research participants took part in the research: 601 5<sup>th</sup>-11<sup>th</sup> form school learners and 54 teachers from Eišiškės, Kaunas, Panevėžys, Šalčininkai and Vilnius schools (random sampling).

### **2.2. Research stages**

**Stage One.** Scientific literature analysis and designing theoretical component and dynamic creativity process models. Defining of “creativity”, “creative thinking”, “creative work” concepts.

**Stage Two.** Identifying creativity research parameters. Selecting methods for research into creative thinking. Designing questionnaires for research into personality traits (self-esteem, interests, psychological well-being, learning motives, value orientations) and self-education, participation in non-formal and informal education for learners and teachers.

**Stage Three.** Research into learner and teacher creativity dimensions using a questionnaire and two creativity parameter evaluation tests by E. E. Туник (2002). The research was performed in 2008-2009.

**Stage Four.** Statistical research data analysis. Drawing conclusions. Designing recommendations for teachers and education leaders on the development of creativity.

### **2.3. Research methods and procedure**

1. During Stage 1 the *analysis of scientific literature resources* was performed: the concepts of creation, creative thinking, creativity were analysed, component and dynamic creativity process models were designed.

2. During stages 2 and 3 a *questionnaire survey* was applied. The questionnaire was designed to research learner and teacher personality traits (self-esteem, interests, psychological well-being, learning motives, value orientations) and research participants' social-demographical data. The questionnaire was designed by the author of the research on the basis of a monograph by D. Beresnevičienė (1995).

Brief description of the questionnaire:

1) Part of the questions aimed at identifying research participants' factual data (age, gender, order by birth).

2) Part of the questions aimed at identifying self-education needs (how many hours a day are spent by research participants watching TV, how many hours a day are spent chatting on-line with friends, how many hours are spent

on playing computer games, how many books were read a month), will for independent work (how much time is spent on doing homework), need to attend creative thinking training clubs (if there is an intention to attend them), learner interest in science and art (what subjects are most favourable at school or in clubs).

3) Psychological well-being while learning was researched using a *scale of semantic differentiation* (Beresnevičienė, 1995). The scale was comprised of 6 parameters: "dislike-like", "disgusting-lovely", "difficult-easy", "boring-interesting", "useful-harmful", "I succeed-I don't succeed" in learning at school. The research participant had to rate each of these parameters by choosing one of seven variants from -3 to +3.

4) Learner learning difficulties were researched using a questionnaire designed by D. Beresnevičienė (1995). The participants were asked to evaluate ten difficulties: "It is difficult to do homework", "It is difficult to make myself work with myself", "Teachers' requirements are too high", "The school programme is too complicated", "The speed of learning is too high", "I'm lagging behind and it is difficult to catch up with schoolmates", "My relationship with classmates is not perfect", "I don't like strict and demanding schooling system", "It is difficult to learn as friends don't learn", "It is not interesting to learn". The participants had to rate each difficulty in points from 10 (the highest difficulty) to 1.

5) The research participants' value orientations were researched having supplemented the *questionnaire* designed by D. Beresnevičienė (1995). The participants were asked to rate twelve factors: "Money", "Opportunity to do favourite job", "Opportunity to grow as a personality", "Health", "Love", "Good relationships with peers", "Good relationships with adults", "Opportunity to create", "Good relationships with close people", "To be noticed and appreciated", "Opportunity to do a career", "Opportunity to work/study abroad". The participants had to rate each factor in points from 10 (as the most important factor) to 1. Each point could be repeated no more than twice.

6) The self-esteem of the research participants was researched applying a *scale of semantic differential* (Beresnevičienė, 1995), having supplemented it by nine parameters. The scale consisted of 15 parameters: "weak-strong", "timid-brave", "horrible-beautiful", "lazy-hardworking", "foolish-clever", "loser-winner", "hostile-friendly", "passive-active", "revengeful-forgiving", "not creative-creative", "slow-fast", "talentless-talented", "generous-greedy", "not jealous-jealous", "innovative-traditional". The research participant had to rate all of these parameters by choosing one out of seven variants from -3 to +3.

3. To identify the participants' creative thinking parameters (abundance of ideas, flexibility, originality) two E. E. Туник's (2002) creative thinking *tests* were used. In order to identify the abundance of ideas all variants presented by the participant were calculated (each response was allotted 1 point). To identify the flexibility of creative thinking all participant's response categories were calculated, whereas flexibility was determined having multiplied the number of categories by 3. The originality of creative thinking was assessed this way: each original response (not recurring in a group of 30-40 research participants) was evaluated by 5 points; all points were added. The general indicator of the participant's creative thinking was calculated by summing all points received for the abundance of ideas, flexibility and originality.

4. Statistical analysis was performed using the statistical information processing programme package SPSS (*Statistical Package for the Social Science*) 14.0 version.

The research was performed in group experiment of the selected school classes – together with all class pupils. Before the experiment the aim of the research was explained to the learners and psychological atmosphere favourable for the experiment was created. Performing the test assignments, the time set for carrying out the task was measured. The time set to respond to the questionnaire was not limited.

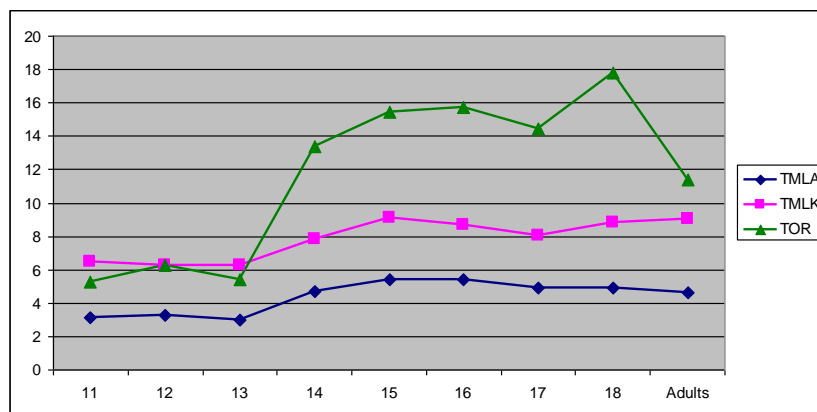
### **3. FINDINGS OF EMPIRICAL RESEARCH**

#### **3.1. Development of creative thinking in its ontogenesis**

Research results showed that parameters of creative thinking (flexibility of thinking, originality and abundance of ideas) change with age. Having calculated creative thinking results according to the first creative thinking test (T1) and second creative thinking test (T2), the common creative thinking indicator was calculated (T), derived from the means of T1 and T2.

As seen in Figure 4, parameters of creative thinking (abundance of ideas, flexibility of thinking and originality), are rapidly changing in its ontogenesis, however, the change is different. Statistical data analysis (ANOVA) showed that every measurement of indicators of creative thinking flexibility (TMLK), originality (TOR) and abundance of ideas (TMLA) is different from each other at 11 years of age or at 12, 13, 14, 15, 16, both among groups and within groups.





Note: TMLA – scope of creative thinking (abundance of ideas); TMLK - creative thinking flexibility; TOR - creative thinking originality; 11, 12, 13, 14, ..., adults – age of participants.

**Fig. 4. Development of parameters of creative thinking (originality, flexibility of thinking, abundance of ideas) in its ontogenesis**

### 3.2. Comparison of parameters of creative thinking in different gender, order of birth, place of residence and learning progress groups

#### 3.2.1. Comparison of parameters of creative thinking in different gender groups

Aiming at identifying how different the parameters of creative thinking are in different gender groups, creative thinking means and standard deviations were calculated in these groups.

As illustrated in Table 1, all females' parameters of creative thinking were higher than those of males. It was determined that common indicators of creative thinking in female and male groups were statistically significantly different. The common indicator of creative thinking T in the girls' group was higher ( $\chi^2=568.616$ ,  $df=144$ ,  $p=0.000$ ) than in the boys' group.

**Table 1**  
**Means of parameters of creative thinking in different gender groups**

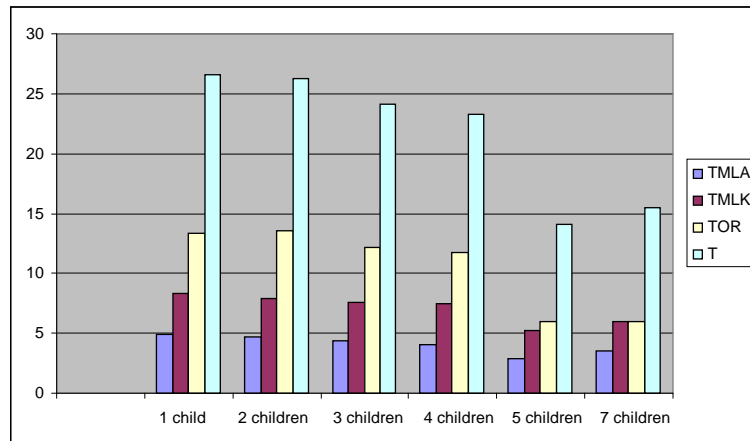
Gender	Parameters	TMLA	TMLK	TOR	T
Females	Mean	4.9852	8.2590	13.6148	26.8852
	N	305	305	305	305

	SD	3.36398	4.28547	13.8776 9	20.4560 7
Males	Mean	4.5159	7.8357	12.4841	24.8746
	N	283	283	283	283
	SD	2.89453	3.98228	14.3208 1	20.0750 6

Notes: T – common indicator of creative thinking; TMLA – scope of creative thinking (abundance of ideas); TMLK – creative thinking flexibility; TOR – creative thinking originality; N – number of research participants in groups.

### 3.2.2. Comparison of parameters of creative thinking in different groups according to birth order

Aiming at identifying how parameters of creative thinking (common indicator of creative thinking, flexibility of thinking, originality and abundance of ideas) differ in groups according to the order of birth, creative thinking means and standard deviations were calculated in the above mentioned groups (see Table 13). The researched showed that the first child in the family exhibited highest creative thinking common indicators: T ( $\bar{X}=26.6155$ ,  $\sigma=19.8017$ ), the second child in the family exhibited slightly lower common indicators of creative thinking: T ( $\bar{X}=26.2220$ ,  $\sigma=21.0569$ ), the third child in the family exhibited even lower common points T ( $\bar{X}=24.1400$ ,  $\sigma=18.7156$ ), the common indicator of creative thinking of the fourth child was slightly lower than that of the third child: T ( $\bar{X}=23.3095$ ,  $\sigma=20.57272$ ), whereas the fifth child in the family exhibited the lowest common indicators of creative thinking indicators: T ( $\bar{X}=14.12500$ ,  $\sigma=13,0280$ ). The seventh child in the family (we had only 1 such in our research group) exhibited similar creative thinking skills (slightly higher) as the fifth child in the family: T ( $\bar{X}=15.5000$ ). As the comparison of common indicators of creative thinking and separate parameters of creative thinking (flexibility of thinking, scope of creative thinking or abundance of ideas and originality) in groups according to birth order in the family showed, statistically significant differences were not found.



Notes: TMLA – scope of creative thinking (abundance of ideas); TMLK – creative thinking flexibility; TOR - creative thinking originality; T – common indicator of creative thinking.

**Fig. 5. Means of parameters of creative thinking in groups according to birth order**

### 3.2.3. Comparison of parameters of creative thinking in the only child families and families with more children

The research found out that all parameters of creative thinking of the only children in families are higher than respective parameters in other children (from not only child families) group and these differences are statistically significant ( $\chi^2$  test was calculated). The means of parameters of creative thinking in the only child and other children groups are presented in Table 2.

**Table 2**  
**Means of parameters of creative thinking in the only child and other children groups**

	Unit	N	Mean	Standard Deviation	Std. Error Mean
TMLA	only child	104	4.9663	3.36837	.33030
	not only child	495	4.7202	3.08516	.13867
TMLK	only child	104	8.3365	4.02507	.39469
	not only child	495	8.0081	4.15391	.18670
TOR	only child	104	14.1779	13.76359	1.34963
	not only child	495	12.9465	14.07149	.63247

T	only child	104	27.4567	20.03021	1.96412
	not only child	495	25.7182	20.19780	.90782

Notes: T – common indicator of creative thinking; TMLA – scope of creative thinking (abundance of ideas); TMLK - creative thinking flexibility; TOR – creative thinking originality; N- number of research participants.

### 3.2.4. Comparison of parameters of creative thinking in groups according to place of residence

Having compared the indicators of creative thinking in groups according to place of residence it was determined that creative thinking skills (common indicator of creative thinking, originality of thinking, abundance of ideas and flexibility of thinking) differ among the residents of Panevėžys, Vilnius, Kaunas, Šalčininkai cities and Eišiškės village (both teachers and learners) and the difference is statistically significant ( $p=0.000$ ).

### 3.2.5. Comparison of parameters of creative thinking in groups according to learning progress

In order to identify how parameters of creative thinking differ in groups according to learning progress, two senior form learner groups were formed according to learning progress: high learning progress learner group (which involved learners from Kaunas Jesuits Gymnasium) and medium learning progress learner group (which involved learners of the same age from other schools) and calculated creative thinking means and standard deviations in these groups. All parameters of creative thinking, measured by both tests, were higher in higher learning progress learner group, comparing their results with the appropriate medium learning progress learner group results.

The research found (using Student criterion) that high learning progress learners exhibited statistically significant higher ( $p<0.05$ ) common indicators of creative thinking than their peers medium learning progress learners:  $t(222)=-3.025$ ,  $p=0.003$ .

### 3.3. Correlation between the parameters of creative thinking and other personality creativity dimensions

#### 3.3.1. Correlation between the parameters of creative thinking and interest in science and art

The correlation between the parameters of creative thinking and interest in science and art are presented in Table 3.

**Table 3**  
**Correlations between creative thinking and interest in science and art**

	TMLA	TMLK	TOR	T
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Interest in science	r	.330(**)	.319(**)	.300(**)	.325(**)
	p	.000	.000	.000	.000
	N	606	606	606	606
Interest in art	r	.096(*)	.078	.099(*)	.100(*)
	p	.018	.054	.014	.013
	N	606	606	606	606

Note: TMLA – scope of creative thinking (abundance of ideas); TMLK – creative thinking flexibility; TOR – creative thinking originality; T – common indicator of creative thinking; r – Pearson correlation; p – probability; N – number of research participants. \*\* Correlation is significant at level 0.1. \* Correlation is significant at level 0.05.

Positive correlations between all the parameters of creative thinking and interest in science and art were obtained, i.e. the higher interest in science and art is, the higher is the research participants' parameters of creative thinking.

### 3.3.2. Correlation between parameters of creative thinking and self-esteem

It was found out that the more research participants evaluate themselves according to the criterion “fond of novelties”, the higher are all their creative thinking indicators ( $p < 0.05$ ): correlations between common indicator of creative thinking T and self-esteem according to the criterion “fond of novelties” ( $r = 0.121$ ,  $p = 0.004$ ), between the scope of creative thinking, i.e. abundance of ideas ( $r = 0.134$ ,  $p = 0.002$ ), between flexibility of thinking ( $r = 0.151$ ,  $p = 0.000$ ), between thinking originality ( $r = 0.101$ ,  $p = 0.017$ ).

It was identified that the more participants value themselves according to the criterion “hard-working”, the less are all their indicators of creative thinking ( $p < 0.01$ ), the differences are statistically significant: negative correlations were found between the common indicator of creative thinking T and self-esteem according to the criterion “hard-working” ( $r = -0.160$ ,  $p = 0.000$ ), creative thinking flexibility and self-esteem ( $r = -0.163$ ,  $p = 0.000$ ), abundance of ideas and self-esteem ( $r = -0.152$ ,  $p = 0.000$ ), originality and self-esteem ( $r = -0.149$ ,  $p = 0.000$ ).

The research showed that the more the participants value themselves according to the criteria “talented”, “creative”, “intelligent”, “generous”, the higher their common indicator of creative thinking is ( $p < 0.05$ ), the more they value themselves according to the criteria “talented”, “creative”, “intelligent”, the higher their originality is ( $p < 0.05$ ), the more they value themselves according to the criteria “generous” and “fond of innovations”, the higher

their creative thinking flexibility is ( $p < 0.05$ ), the more they value themselves according to the criteria “hard-working” and “jealous”, the lower their originality is ( $p < 0.05$ ).

### **3.3.3. Correlation between the parameters of creative thinking and psychological well-being**

Statistically significant correlations between the parameters of creative thinking and psychological well-being were identified. The research showed that the better the learner’s psychological well-being while learning is according to the parameters “I succeed” and “useful”, the better all the creativity parameters are ( $p < 0.01$ ): positive statistically significant correlations between psychological well-being according to the parameter “I succeed” and abundance of ideas ( $r = 0.184$ ,  $p = 0.000$ ), flexibility of thinking ( $r = 0.158$ ,  $p = 0.000$ ), thinking originality ( $r = 0.148$ ,  $p = 0.000$ ) and common indicator of creative thinking ( $r = 0.165$ ,  $p = 0.000$ ) were determined. Positive statistically significant correlations between psychological well-being were identified according to the parameters “useful” and abundance of ideas ( $r = 0.236$ ,  $p = 0.000$ ), flexibility of thinking ( $r = 0.198$ ,  $p = 0.000$ ), thinking originality ( $r = 0.213$ ,  $p = 0.000$ ), and common indicator of creative thinking ( $r = 0.227$ ,  $p = 0.000$ ).

### **3.3.4. Correlation between the parameters of creative thinking and value orientations**

Statistically significant correlations were identified between parameters of creative thinking and value orientations. The research showed that the more learners value “possibility to create”, the higher their common indicator of creative thinking T is, the more learners value such values as “money”, “good peer relationships”, “good relationship with adults”, the lower their common indicator of creative thinking is T ( $p < 0.05$ ).

## **3.4. Correlations between parameters of creative thinking and the need for self-education, need to attend creative thinking training clubs, peculiarities of will for independent work and learning difficulties**

### **3.4.1. Correlations between parameters of creative thinking and the need for self-education and creativity**

Aiming at identifying the correlations between the parameters of creative thinking (common indicator of creative thinking, flexibility of thinking, abundance of ideas and originality of thinking) and needs for self-education (learner’s time spent on self-education by reading books, watching TV, chatting on-line with friends and playing computer games) and need to attend creative thinking training clubs and peculiarities of will for independent work (time spent on doing homework), first of all, correlations between the parameters of creative thinking and the mentioned dimensions were

calculated (see Table 3).

**Table 3**

**Correlations between creative thinking and needs for self-education and creativity**

Parameters		TMLA	TMLK	TOR	T
LTV	r	-.320(**)	-.292(**)	-.335(**)	-.344(**)
	p	.000	.000	.000	.000
	N	604	604	604	604
LK	r	-.095(*)	-.092(*)	-.128(**)	-.125(**)
	p	.021	.025	.002	.002
	N	594	594	594	594
LZ	r	-.197(**)	-.172(**)	-.170(**)	-.183(**)
	p	.000	.000	.000	.000
	N	596	596	596	596
KS	r	.028	.009	.048	.041
	p	.486	.829	.239	.317
	N	604	604	604	604
ND	r	.073	.084	.077	.083
	p	.092	.053	.073	.054
	N	537	537	537	537
KM	r	.222(**)	.232(**)	.253(**)	.256(**)
	p	.000	.000	.000	.000
	N	522	522	522	522

Note: LTV – time spent on watching television time spent on watching television ; LK – time spent on chatting on-line with friends; LZ – time spent on playing computer games; KS – number of books read per month; ND – time spent on doing homework; KM – need to attend a creative thinking training club.

Statistically significant correlations were determined between the parameters of creative thinking and need for self-education. It was determined that the more research participants intend to attend creative thinking training clubs, the higher all their parameters of creative thinking ( $p < 0.01$ ) are. The more learners read books, the higher their thinking originality is ( $p < 0.05$ ).

The research showed that the more time (hours per day) the participants spend on watching television, the lower statistically significant all their parameters of creative thinking ( $p < 0.01$ ) are. Negative statistically significant correlations were found between the common indicator of creative thinking T

and time spent on watching television (LTV:  $r=-0.344$ ,  $p=0.000$ ).

It was determined that the more time per day is spent on playing computer games, the lower all parameters of creative thinking ( $p < 0.01$ ) are. Negative statistically significant correlations were found between the common indicator of creative thinking T and time spent on playing computer games (LZ:  $r=-0.183$ ,  $p=0.000$ ).

It was determined that the more time is spent on chatting on-line with friends, the lower all parameters of creative thinking ( $p < 0.05$ ) are. Negative statistically significant correlations were also found between the common indicator of creative thinking T and time spent on on-line communication with friends (LK:  $r=-0.125$ ,  $p=0.002$ ).

#### **3.4.2. Correlation between parameters of creative thinking and learning difficulties**

Aiming at identifying how the parameters of creative thinking (common indicator of creative thinking, flexibility of thinking, abundance of ideas and originality of thinking) correlate with learning difficulties, correlations between creative thinking and learning difficulties were calculated.

Negative statistically significant correlations were obtained between all the parameters of creative thinking and learning difficulties. The higher all the parameters of creative thinking are, the easier it is for learners to learn and they face lower difficulties in the learning process. The higher the parameters of creative thinking, the easier it is for learners to adapt to the "strict and demanding learning system" ( $p < 0.01$ ), the easier it is "to do the homework". The higher the parameters of creative thinking are, the easier it is for learners to adapt to "too complicated teaching curriculum" ( $p < 0.05$ ), the easier it is for learners to adapt to "too fast speed of learning" ( $p < 0.05$ ).

#### **4. DISCUSSION OF RESEARCH FINDINGS**

Empirical research findings, obtained during the research (see Fig. 10), confirm the regularities of intellect development found by R. Cattell (1963, 1965) and J. Horn (1967, 1968). In this dissertation the same as in the research by J. Kershner and G. Ledger (1985) it was determined that females' parameters of creative thinking (abundance of ideas, flexibility and originality) were higher than those of males. Our research findings are similar to those obtained by M. Runco and M. Bahlenda (1986) were the best results of divergent thinking test were exhibited by the only-children in the family. Our research found negative correlations between time spent on watching television and all the measures creativity parameters (common indicator of creative thinking, flexibility of thinking, abundance of ideas and originality of thinking), measured by both the first and the second tests ( $p < 0.01$ ). This



confirms the reduction hypothesis. Our research as well as correlation research performed by foreign researchers investigated the impact of the structure of television programmes and certain programme types upon creativity. There is a probability that educational programmes and those of awareness raising can stimulate creativity, still a lack of such programmes was found on Lithuanian television channels.

### **CONCLUSIONS**

1. The research showed that creativity (process and its results) is affected by the following factors: creator's motivation, entirety of personality features and character traits, abilities, thinking, memory, size of thinking inertia, special and general knowledge, reproductive and creative imagination, intuition, the creating person's behaviour, emotions, physiological and psychological state, social and physical environment.

2. Having analysed the scientific literature, component and dynamic creativity process models were designed. Component creativity process model consists of these components: personality, environment, conflict (psychological tension inside the creator), creator's decision to create, activity (creator's actions when using various materials and applying tools appropriate for the activity creator turns the chosen object into the product of creativity), product presentation and assessment and creative work.

3. The dynamic creativity process model presents 7 creativity process stages (conflict, preparation, creative work, incubation, verification, oblivion, dissemination), 4 psychological, social and of other nature barriers that distinguish them (decision making, the unknown, problem, requirements), 26 possible variants of the process procedure (from unsuccessful end of creativity to successful transition from one stage to another).

4. The research confirmed the first hypothesis that creative thinking originality reaches its peak at the age of 18 and then decreases ( $p=0.000$ ). It was determined that creative thinking originality grows significantly from 11 to 12 and then falls down at 13, then grows very rapidly from 13 to 16 years of age, then originality decreases again and at the age of 18 as if reaches its maximum and then falls down sharply till adulthood. Having calculated the comparison of originality means in different age groups using ANOVA, it was determined that each measurement at 11 years of age as well as at 12, 13, 14, 15, 16, 17, 18 and in adulthood differs from each other and the difference is statistically significant ( $p=0.000$ ).

5.1 The dissertation research confirmed the second hypothesis that there exists a positive direct statistically significant correlation between all the parameters of creative thinking (common indicator of creative thinking,

abundance of ideas, flexibility, originality) and personality interest in science, i.e. the higher the interest in science, the higher are all parameters of creative thinking ( $p < 0.01$ ).

5.2 The dissertation research confirmed the hypothesis that there exists a positive direct statistically significant correlation between the parameters of creative thinking (common indicator of creative thinking, abundance of ideas, originality) and personality interest in art, i.e. the higher the interest in art, the higher are all parameters of creative thinking ( $p < 0,05$ )

6. Comparing junior and senior adolescents and teacher creative thinking it was determined that senior form learners exhibited higher parameters of creative thinking than junior learners:  $t(578) = -8.556$ ,  $p = 0.000$ . Comparing teacher and junior form learners' creative thinking parameters it was determined that teachers' common indicator of creative thinking was higher than that of learners:  $t(217) = -4.799$ ,  $p = 0.000$ .

6. Comparing teacher and senior form learner creative thinking parameters, it was determined that all teachers' creative thinking indicators were lower than those of senior form learners, however, statistically significant differences were found only while estimating thinking originality. It was determined that senior form learners exhibit higher creative thinking originality than teachers:  $t(458) = 2.196$ ,  $p = 0.029$ .

7.1. Having compared creative thinking parameters (abundance of ideas, flexibility, originality) in groups according to gender it was determined that females better than males performed all assignments of creative thinking ( $p = 0.000$ ).

7.2. Having compared the parameters of creative thinking in groups according to the order of birth, it was determined that the highest indicators of creative thinking were found in the first child in the family, slightly lower ones in the second child, lower in the third child, the parameters of creative thinking of the fourth child were slightly lower than the third child whereas the fifth child in the family exhibited the lowest common indicators of creative thinking; however, the differences were statistically insignificant.

7.3. Having compared creative thinking indicators in the only-child and other children groups it was determined that all only-children's creative thinking indicators (common indicator of creative thinking, abundance of ideas, flexibility of thinking, originality) were higher than those of other children and these differences were statistically significant ( $p = 0.000$ ).

8. Statistically significant correlations were determined between the parameters of creative thinking and self-esteem. It was determined that the more research participants evaluate themselves according to the criterion "fond of novelties", the higher are their all creative thinking indicators

( $p < 0.05$ ), the more they evaluate themselves according to the criteria “talented”, “creative”, “intelligent”, “generous”, the higher their common indicator of creative thinking is ( $p < 0.05$ ); the more they evaluate themselves according to the criterion “hard-working” and “jealous”, the lower their originality is ( $p < 0.05$ ).

8.2. Statistically significant correlations were determined between the parameters of creative thinking and psychological well-being. The research showed that the higher the learner’s psychological well-being while learning is according to the parameters “I succeed” and “useful” the higher all creativity parameters are ( $p < 0.01$ ).

8.3. Statistically significant correlations were determined between the parameters of creative thinking and value orientations. The research showed that the more learners value the “possibility to create”, the higher their common indicator of creative thinking is and the more learners value such values as “money”, “good relationships with peers”, the lower their common indicator of creative thinking is ( $p < 0.05$ ).

9. Statistically significant correlations were determined between the parameters of creative thinking and needs for self-education.

9.1. It was determined that the more research participants want to attend creative thinking training clubs, the higher their all parameters of creative thinking are ( $p < 0.01$ ). The more learners read books, the higher their thinking originality is ( $p < 0.05$ ).

9.2. The research showed that the more time (hours per day) the research participants spend on watching television, the lower and statistically significant all their parameters of creative thinking are ( $p < 0.01$ ). It was determined that the more time they spend on playing computer games the lower all their parameters of creative thinking are ( $p < 0.01$ ) and the more time is spent on chatting on-line with friends, the lower all their parameters of creative thinking are ( $p < 0.05$ ).

## **RECOMMENDATIONS**

1. Educating learners and teachers and developing creative society in Lithuania it is important to create educational assumptions for self-education of citizens in various periods of age:

1.1. to foster learner creative thinking training needs from the first form involving learners to clubs of extracurricula education (art, music, technical creativity and etc.) and various clubs that enhance learner scientific interest (nature cognition, ecology, chemistry and etc.);

1.2. to establish special creative thinking training clubs for 5<sup>th</sup>-12<sup>th</sup> form learners which base their activity on problem solving methods, present the

basics of heuristics and creativity psychology, train creative imagination, develop divergent, analytical, critical and ingenious thinking;

1.3. organise qualification upgrading courses for all teachers where they could develop their creative thinking, and to prepared the most creative teachers to guide special clubs that develop creative thinking;

1.4. for senior form teachers who work with more talented children and understand that their learner creative thinking (particularly originality) can be higher than their own, it is essential to train such dimensions of creative personality as self-esteem, self-confidence, motivation to enhance learners' free creativity, discover problem solving by new non-traditional methods and teach them to feel safe, without devaluing themselves or learners even when the learner surpasses the teacher by his creativity;

1.5. for senior form teachers who work with more talented learners it is advisable to create special self-education courses how to work with talented learners;

1.6. to increase integration of creative thinking, intuition and imagination training activities, tasks into general education programmes, assigning learners to perform projects that develop creativity, foster learners to find solution to problem by new non-standard methods;

2. Creativity process depends on a number of factors, therefore, aiming at developing a creative and creating personality, the teacher should:

2.1. form learner and his own internal motivation to create and appreciate creativity as a value;

2.2. develop learner and his own self-confidence and confidence in learners;

2.3. create favourable conditions to one's own and learner creative work.

3. Taking into account that the most creative learners do not tend to surrender and yield to authorities, ignore the set rules and tend to create their own rules, tend to communicate less and come into conflicts with environment more, teachers should help them to adapt in school community and learn to solve problems related to communication with peers and adults.

4. Teachers can advise learners who aim at developing their creativity and creative thinking to watch television less, to spend less time at computers and to read books more.

5. Taking into account that the only-children and the first children in the family have higher creativity potential, teachers can assign these learners more creativity demanding tasks and advise them to develop their creative self-expression.

6. Teachers are advised to increase learner self-esteem and self-confidence by various pedagogical measures. Increase in self-esteem can

contribute to the development of creativity.

7. Learners who cannot be characterised as very hard-working are recommended to attend clubs of extracurricula education enhancing them to undertake creative activity which is attractive to them and interesting.

## APPROBATION OF THE RESEARCH RESULTS

### *The publications on the dissertation topic in reviewed periodical editions*

1. Beresnevičius, Gediminas (2006). Kūrybiškumo fenomenas: edukacinis aspektas. *Kūrybos erdvės*, Nr. 4, p. 80–90.
2. Beresnevičius, Gediminas (2006). Kūrybiško sprendimo ieška algoritminiais metodais. *Acta Paedagogica Vilnensia*, 17 t. p. 57–65.
3. Beresnevičienė, Danguolė, Beresnevičius, Gediminas, Gumuliauskienė, Aušrinė, Kirvelis, Dobilas (2006). Anticipatory Model of Constructivistic Creative Thinking. *International Journal of Computing Anticipatory Systems*, Vol. 18, Liege: University of Liege, CHAOS, Belgium, p. 277–287.
4. Beresnevičienė, Danguolė, Beresnevičius, Gediminas, Kirvelis, Dobilas (2008). Forgiveness as Anticipatory Creativeness Implemented way Informational Analysis by Synthesis Procedure. *International Journal of Computing Anticipatory Systems*, CHAOS abl., Vol. 21, p. 99–108.
5. Beresnevičienė, Danguolė, Beresnevičius, Gediminas, Bardinskienė, Ina, Kirvelis, Dobilas (2008). Training of Creative Thinking in Primary School. *International Journal of Computing Anticipatory Systems*, CHAOS abl., Vol. 21, p. 25–36.

### *The publications on the dissertation topic in the editions of conferences*

1. Beresnevičienė, Danguolė, Beresnevičius, Gediminas, Kirvelis, Dobilas (2007). Forgiveness as Anticipatory Creativeness Implemented way Informational Analysis by Synthesis Procedure. *Abstract book of Eighth International Conference on Computing Anticipatory Systems*, Symp. 7, Liege: University of Liege, CHAOS, Belgium, p. 14–15.
2. Beresnevičienė, Danguolė, Beresnevičius, Gediminas, Bardinskienė, Ina, Gumuliauskienė, Aušrinė (2007). Development of Creative Thinking in Childhood. *Abstract book of Eighth International Conference on Computing Anticipatory Systems*, Symp. 6, Liege: University of Liege, CHAOS, Belgium, p. 4–5.

### *The papers on the dissertation topic read at scientific conferences*

1. Beresnevičius, Gediminas et al. Development of Creative Thinking in Childhood. *Eighth International Conference on Computing Anticipatory Systems*, Symp. 7. Liege, Belgium.
2. Beresnevičius, Gediminas. Kūrybinio mąstymo raida ontogenezėje. 14

international conference *Creativity across the lifespan of an individuality*.  
2009.11.7 d. Ryga.

*The seminars and courses held on the dissertation topic*

1. Beresnevičius, Gediminas. Paskaita „Kūrybinis mąstymas pokyčių erdvėje“, kasmetinė vadovų konferencija „Poveikio anatomija“ 2008 m. spalio 10 d. Druskininkai.
2. Beresnevičius, Gediminas. Pranešimas Forume kūrybingai visuomenei: kultūros, švietimo ir verslo jungtys (sekcijoje „Kūrybiškumo ugdymo situacija švietimo sistemos kontekste“), 2009 m. lapkričio 4 d., Lietuvos Respublikos Seimas, Vilnius.

#### INFORMATION ABOUT THE AUTHOR

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# KŪRYBIŠKUMO IR KŪRYBINIO MĄSTYMO EDUKACINĖS DIMENSIJOS

## Reziumė

**Tyrimo teorinis aktualumas.** Tiek užsienyje, tiek Lietuvoje stinga mokslinių darbų, skirtų kūrybiškumo įvertinimo problemai: 1) edukologijoje egzistuoja didžiulė sąvokų „kūryba“, „kūrybiškumas“, „kūrybinis mąstymas“ painiava; 2) beveik netyrinėtos kūrybiškumo edukacinės dimensijos bei jų tarpusavio sąsajos; 3) nėra vieningų ir visiems priimtinių kūrybinio mąstymo gebėjimų įvertinimo metodikų; 4) mažai tyrinėta mokinių bei mokytojų kūrybinio mąstymo kaita ontogenezėje; 5) Lietuvoje nėra tyrinėtas ryšys tarp kūrybinio mąstymo ypatumų ir laiko, skirto televizijai žiūrėti, kompiuteriniams žaidimams, knygoms skaityti.

**Tyrimo praktinis aktualumas.** Europos Sąjungos politika bei sudėtinga dabartinė Lietuvos situacija, kuriai būdingi spartūs politiniai, ekonominiai ir socialiniai pokyčiai, lemia, kad asmenybės kūrybiškumas yra vertinamas kaip inovacijų variklis ir lemiamas asmeninių, profesinių, verslo, socialinių gebėjimų, ekonominių, politinių ir švietimo problemų sprendimo faktorius bei visos visuomenės gerovės veiksnys (European Year of Creativity and Innovation 2009). Todėl būtina lavinti kūrybiškumą ir mokyti vaikus kūrybiškai mąstyti – tai pažymi pasaulio lyderiai, švietimo vadovai.

Pastaruoju metu pasaulio politikoje formuojasi nuostata, kad didžiausią ekonominį potencialą ateityje turės tos valstybės, kuriose didelę visuomenės dalį (daugiau kaip 30%) sudarys kūrybiniai darbuotojai (Florida, 2005). Todėl edukologams, mokytojams iškyla svarbus uždavinys: ugdyti kūrybišką asmenybę ir sudaryti sąlygas žmogaus kūrybiškumui bręsti.

Įgyvendinant *Europos Bendrijos Lisabonos programą, siekiančią išlavinti verslumą pagrįstą mąstymą, kurio pagrindinė sudedamoji dalis yra kūrybinis mąstymas*, svarbu ištirti kūrybinį mąstymą lavinančius bei jį stabdančius veiksnius. Ugdant ir mokant būsimą darbdavį (veiklos lyderį) svarbu suprasti kūrybos proceso modelį ir ištirti būsimo verslininko, darbdavio (veiklos lyderio) kūrybiškumo ugdymo bei ugdymosi įvairiais amžiaus tarpsniais edukacines prielaidas (skatinti kūrybinio mąstymo lavinimo poreikius ir formas, mokymo(si) strategijas, lyderių nuolatiniam mokymuisi palankios aplinkos kūrimo, ugdant ir mokant jų ugdytojus, priemones, veiklos lyderiui reikšmingų asmenų nuolatinio mokymosi priemones bei išanalizuoti iki šiol vyravusias Lietuvoje ugdymo klaidas.

Lietuvoje švietimo darbuotojai, mokytojai, mokyklų psichologai neturi



parengtų kūrybinio mąstymo vertinimo metodikų, taigi nukenčia galimybės įvertinti vykdomo kūrybinio mąstymo lavinimo efektyvumą. Visiems švietimo sistemos dalyviams aktualu žinoti, kaip ir kokiomis priemonėmis ugdyti mokinių kūrybiškumą, kas kliudo ir kas padeda jį ugdyti.

**Tyrimo objektas:** kūrybos ir kūrybinio mąstymo procesas, kurio vyksmą lemia psichologiniai, socialiniai, fiziniai ir kitokie veiksniai.

**Tyrimo tikslas:** Teoriniu ir empiriniu lygmeniu nustatyti kūrybiškumo ir kūrybinio mąstymo edukacines dimensijas.

**Hipotezės:**

1. Tikėtina, kad kūrybinio mąstymo originalumas pasiekia maksimumą vyresniojoje paauglystėje (apie 18 metų amžiuje), o po to mažėja.

2. Tikėtina, kad egzistuoja teigiamas tiesioginis ryšys tarp kūrybinio mąstymo parametrų (idėjų gausos, lankstumo, originalumo) ir asmenybės intereso mokslui ir menui.

**Tyrimo uždaviniai:**

1. Išanalizuoti kūrybos ir kūrybiškumo sampratą, kūrybai įtakos turinčius veiksniai bei kūrybinio mąstymo tyrimus.

2. Patikslinti sąvoką „kūrybiškumas“.

3. Išanalizavus mokslinę literatūrą, parengti komponentinį ir dinaminį kūrybos proceso modelius.

4. Išanalizuoti kūrybinio mąstymo raidą ontogenezeje.

5. Palyginti kūrybinio mąstymo parametrus (idėjų gausos, lankstumo, originalumo) grupėse pagal lytį, pagal tai, kelintas vaikas šeimoje, gyvenamąją vietą ir pažangumą.

6. Nustatyti ryšį tarp kūrybinio mąstymo parametrų ir kitų asmenybės kūrybiškumo dimensijų (mokinių intereso mokslui bei menui, savivertės, psichologinės savijautos mokantis, vertybinių orientacijų).

7. Nustatyti ryšį tarp kūrybinio mąstymo parametrų (idėjų gausos, lankstumo, originalumo) ir savišvietos poreikių (laiko, skirto mokinių savišvietai skaitant knygas, žiūrint televizorių, kompiuteriu susirašinėjant su draugais bei žaidžiant kompiuterinius žaidimus), poreikio lankyti kūrybinio mąstymo lavinimo būrelius, valios savarankiškam darbui ypatumų (laiko, skiriamo namų darbams parengti) ir mokymosi sunkumų įveikimo.

8. Remiantis teorinio ir empirinio disertacinio tyrimo rezultais parengti rekomendacijas švietimo politikams, pedagogams.

**Metodologinis tyrimo pagrindas**

1. Tyrimas paremtas mokslinės metodologijos sisteminiu-struktūriniu principu: apibrėžiama kūrybiškumo sąvoka, atskiriant ją nuo semantiškai artimų sąvokų (kūryba, kūrybinis mąstymas, kūrybos produktas ir kt.) ir,

apibendrinus mokslinę literatūrą, sukuriami teoriniai komponentinis ir dinaminis kūrybos proceso modeliai.

2. Tyrimas remiasi L. Jovaišos (2007) ugdymo filosofijos koncepcija, kad „ugdymas – asmenybę kuriantis žmonių bendravimas sąveikaujant su aplinka bei žmonijos kultūros vertybėmis. Ugdymas – bendriausia pedagogikos kategorija, apimanti auginimą, švietimą, mokymą, lavinimą, auklėjimą, formavimą“ (Jovaiša, 2007, p. 311), o nepertraukiamas ugdymas – ugdymo filosofijos sąvoka, „atspindinti pažiūrą, kad ugdymas yra ilgalaikis procesas, pradedamas nuo gimimo ir tęsiamas visą gyvenimą, t.y. apimantis visus amžiaus tarpsnius ir švietimo bei mokymo formas“ (Jovaiša, 2007, p. 181)

3. Tyrimas remiasi L. Jovaišos sąvokų interpretacija, kurioje teigiama, kad kūrybiškumas yra „asmenybės savybių kompleksas, leidžiantis produktyviu darbu pasiekti originalių, visuomeniškai reikšmingų, kokybiškai naujų veiklos rezultatų“ (Jovaiša, 2007, p.127).

4. Disertacinis tyrimas remiasi L. Jovaišos (1999, 2001) visybine asmenybės struktūros teorija, kuri jungia skirtingas metodologines mokyklas (bruožų ir faktorių teoriją, asmenybės aktyvumo teoriją, kognityvinę teoriją bei dinamines teorijas). L. Jovaišos ugdymo teorijoje visybinę asmenybės struktūrą sudaro Aktyvumo blokas, Gebėjimų blokas, Būdo blokas ir Kryptingumo blokas.

5. Tyrimas remiasi humanistinės psichologijos metodologija, kurioje teigiama, kad kūrybiškumas – savirealizacijos siekiančios asmenybės bruožas, kad save realizuojanti asmenybė „stengiasi atrasti naujus kelius, užuotėjusi saugiais, kitų pramintais takeliais“ (Maslow, 2006).

6. Tyrimas remiasi visiškai funkcionuojančios asmenybės teorija (Rogers, 2005). Tik siekianti saviraiškos, laisva, kūrybiška, atvira patirčiai asmenybė gali būti visiškai funkcionuojančia asmenybe, sugebančia priimti save ir kitus tokius, kokie jie iš tiesų yra. Tik įsiklausydama į tai, kas vyksta „čia ir dabar“, ji sugeba išgirsti savo tikruosius poreikius ir troškimus, išgirsti savo vidinį balsą ir siekti patenkinti savo kūrybos, saviraiškos ir laisvės mokytis poreikius.

7. Tyrimas remiasi fenomenologine ugdymo psichologija. C. Rogers (2005) pabrėžė individo unikalumą ir laisvę pasirinkti, kaip elgtis, jo elgesiui neturi didelės įtakos nei atsakymas į pasąmonės jėgas, kaip teigia S. Freud, nei į išorinius stimulus, kaip teigia bihevioristai, bet jo elgesys priklauso nuo individo išorinio pasaulio suvokimo, supratimo ir interpretacijos. Pasaulyje niekas kitas negali žinoti mūsų suvokimo, todėl geriausi ekspertai esame mes patys. Ir ypač reikšmingas yra individo dabarties, momentinės situacijos, suvokimas, interpretavimas ir išgyvenimas, – tai, ką mes matome ir jaučiame „čia ir dabar“, yra svarbiausia.

Kaip teigia C. Rogers (2005), žmogaus elgesį daugiausia lemia jo subjektyvusis pasaulis, jo *fenomenologinė realybė* yra svarbesnė nei fizinis pasaulis. Tai, kaip žmonės interpretuoja dalykus, jiems ir yra tikroji realybė, todėl svarbiausia asmenybės edukologine dimensija jis vadina savivertės koncepciją, nes svarbiausias vertinimas – tai savęs paties vertinimas. Psichologai humanistai savo tyrimuose rėmėsi *fenomenologine filosofija* (Huserlis, Maurice-Morlo Pouty ir kt., cit. pgl. C. Rogers, 2005).

#### **Tyrimo etapai:**

**I etapas.** Mokslinės literatūros analizė ir teorinio komponentinio bei dinaminio kūrybos proceso modelių parengimas. Sąvokų „kūrybiškumas“, „kūrybinis mąstymas“, „kūryba“ analizė ir sąvokos „kūrybiškumas“ patikslinimas.

**II etapas.** Kūrybiškumo tyrimo parametrų nustatymas. Kūrybinio mąstymo tyrimo metodikų parinkimas. Asmenybės savybių (savivertės, interesų, psichologinės savijautos mokantis, mokymosi motyvų, vertybinių orientacijų) ir savišvietos, dalyvavimo neformaliajame bei informaliajame švietime tyrimui skirtų anketų mokiniams ir mokytojams parengimas.

**III etapas.** Mokinių ir mokytojų kūrybiškumo dimensijų tyrimas anketa ir dviem E. E. Туник (2002) kūrybiškumo parametrų įvertinimo testais. Tyrimas vyko 2008–2009 m. Tyrime dalyvavo 655 tiriamieji: 601 V–XI klasių mokinys ir 54 mokytojai iš Eišiškių, Kauno, Panevėžio, Šalčininkų ir Vilniaus mokyklų (atsitiktinė imtis).

**IV etapas.** Statistinė tyrimo duomenų analizė. Išvadų rašymas. Kūrybiškumo ugdymo rekomendacijų mokytojams, švietimo vadovams parengimas.

#### **Tyrimo metodai:**

1. *Mokslinės literatūros analizė.*

2. *Anketinė apklausa.* Naudota anketa, parengta mokinių ir mokytojų asmenybės savybių (savivertės, interesų, psichologinės savijautos mokantis, mokymosi motyvų, vertybinių orientacijų) bei tiriamųjų socialinių-demografinių duomenų tyrimui. Anketą šio tyrimo autorius sudarė remdamasis D. Beresnevičienės (1995) monografija.

3. *Testavimas.* Naudotas E. E. Туник (2002) kūrybinio mąstymo testas.

4. Statistinė analizė atlikta statistinės informacijos apdorojimo programinio paketo SPSS (*Statistical Package for the Social Science*) 14.0 versija.

#### **Mokslinis naujumas ir teorinis reikšmingumas**

- Patikslinta „kūrybiškumo“ sąvoka.
- Išskirtos edukologinės kūrybiškumo dimensijos.
- Ištirtos kūrybiškumo dimensijų tarpusavio sąsajos.

- Parengtas dinaminis kūrybos proceso modelis.
- Parengtas komponentinis kūrybos proceso modelis.
- Nustatyta kūrybinio mąstymo kaita ontogenezėje (nuo 11 metų iki 62 metų amžiaus).
- Nustatyti Lietuvos mokinių kūrybinio mąstymo parametrai (originalumas, mąstymo lankstumas, idėjų gausa) grupėse pagal amžių, lytį, pagal tai, kelintas vaikas šeimoje, pažangumą ir gyvenamąją vietą.

#### **Tyrimo praktinė reikšmė**

Šio darbo pagrindu parengta mokinių kūrybinio mąstymo bei jo parametru (originalumo, mąstymo lankstumo, idėjų gausos) įvertinimo metodika, skirta Lietuvos 5–11 klasių mokiniams bei vidutinio suaugusiojo amžiaus mokytojams. Darbe atskleista asmenybės kūrybiškumo edukologinių dimensijų (vertybinių orientacijų, intereso mokslui ir menui, savivertės, psichologinės savijautos mokantis, savišvietos ir kūrybos poreikių) svarba lavinant mokinių kūrybinį mąstymą. Disertacijoje atskleista neigiama neformaliojo švietimo (televizijos, kompiuterinių žaidimų) įtaka mokinių kūrybinio mąstymo parametrų bei teigiama savišvietos (savarankiško knygų skaitymo) ir vertybinių orientacijų įtaka kūrybiškumo ugdymui(si).

#### **IŠVADOS**

1. Tyrimas parodė, kad kūrybos procesui ir jos rezultatui turi įtakos tokie veiksniai: kūrėjo motyvacija, asmenybės savybių ir charakterio bruožų visuma, gebėjimai, mąstymas, atmintis, mąstymo inercijos dydis, specialiosios ir bendrosios žinios, atkuriamoji ir kuriamoji vaizduotė, intuityva, kuriančiojo elgesys, emocijos, fiziologinė ir psichologinė būseną, socialinė ir fizinė aplinka.

2. Išanalizavus mokslinę literatūrą, parengti komponentinis ir dinaminis kūrybos proceso modeliai. Komponentinį kūrybos proceso modelį sudaro tokie pagrindiniai struktūriniai elementai: asmenybė, aplinka, konfliktas (psichologinė įtampa kūrėjo viduje), kūrėjo apsisprendimas kurti, veikla, kurios metu kūrėjas, naudodamas įvairias medžiagas ir taikydamas pasirinktai veiklai tinkamus įrankius, pasirinktą objektą paverčia kūrybos produktu, produkto pristatymas ir vertinimas bei kūrinys.

Dinaminiam kūrybos proceso modelyje pateikti 7 kūrybos proceso etapai (konfliktas, pasirengimas, kūryba, inkubacija, vertinimas, užmarštis, sklaida), 4 juos skiriantys psichologiniai, socialiniai ir kitokio pobūdžio barjerai (apsisprendimas, nežinomybė, problema, reikalavimai), 26 galimi proceso eigos variantai (nuo nesėkmingos kūrybos pabaigos iki sėkmingų perėjimų iš vieno etapo į kitą).

3. Remiantis L. Jovaišos (2001, 2007), A. Maslow (2006), C. Rogers

(2005) ir disertacinio tyrimo duomenimis, kūrybiškumo sąvoką galima apibrėžti taip: kūrybiškumas – tai asmenybės savybių kompleksas, kurį sudaro kūrybinio mąstymo gebėjimai (Gebėjimų blokas), interesas mokslui arba menui, vertybinės orientacijos (Kryptingumo blokas), psichologinė savijauta mokantis, dirbant, kūrybos ir savišvietos poreikiai, valia savarankiškai dirbti (Aktyvumo blokas), savivertė ir kūrybos prasmės suvokimas (Būdo blokas), leidžiantis produktyviu darbu pasiekti originalių, visuomeniškai reikšmingų, kokybiškai naujų veiklos rezultatų.

4. Tyrimas patvirtino pirmąją hipotezę, kad kūrybinio mąstymo originalumas pasiekia maksimumą 18 metų amžiuje, o po to krinta ( $p=0,000$ ). Nustatyta, kad kūrybinio mąstymo originalumas ryškiai paauga jau nuo 11 iki 12 metų amžiaus ir krinta iki 13 metų, o nuo 13 metų labai sparčiai auga iki 16 metų. 16 metų amžiuje kūrybinio mąstymo originalumas vėl krinta, o 18 metų amžiuje tarsi pasiekia savo maksimumą, viršūnę, o nuo 18 metų vėl ryškiai krinta iki suaugusiojo amžiaus. Apskaičiavus mąstymo originalumo vidurkių palyginimą amžiaus grupėse pagal ANOVA, nustatyta, kad kiekvienas matavimas tiek 11 metų amžiuje, tiek 12, 13, 14, 15, 16, 17, 18 ir suaugusiojo amžiuje vienas nuo kito skiriasi statistiškai reikšmingai ( $p=0,000$ ).

5. Disertacinis tyrimas patvirtino antrąją hipotezę, kad egzistuoja teigiamas tiesioginis statistiškai reikšmingas ryšys tarp visų kūrybinio mąstymo parametrų (bendrojo kūrybinio mąstymo rodiklio, idėjų gausos, lankstumo, originalumo) ir asmenybės intereso mokslui, t.y. kuo didesnis yra interesas mokslui, tuo didesni visi kūrybinio mąstymo parametrai ( $p<0,01$ ). Disertacinis tyrimas patvirtino hipotezę, kad egzistuoja teigiamas tiesioginis statistiškai reikšmingas ryšys tarp kūrybinio mąstymo parametrų (bendrojo kūrybinio mąstymo rodiklio, idėjų gausos, originalumo) ir asmenybės intereso menui, t.y. kuo didesnis yra interesas menui, tuo didesni kūrybinio mąstymo parametrai ( $p<0,05$ ).

6. Lyginant jaunesniųjų, vyresniųjų paauglių ir mokytojų kūrybinį mąstymą nustatyta, kad vyresniųjų klasių mokiniai pasižymėjo aukštesniais kūrybinio mąstymo parametrais negu jaunesnieji mokiniai:  $t(578)=-8,556$ ,  $p=0,000$ . Lyginant mokytojų ir jaunesniųjų klasių mokinių kūrybinio mąstymo parametrus nustatyta, kad mokytojų bendrasis kūrybinio mąstymo rodiklis buvo didesnis nei mokinių:  $t(217)=-4,799$ ,  $p=0,000$ . Lyginant mokytojų ir vyresniųjų klasių mokinių kūrybinio mąstymo parametrus, nustatyta, kad mokytojų visi kūrybinio mąstymo rodikliai buvo mažesni negu vyresniųjų klasių mokinių, tačiau statistiškai reikšmingų skirtumų atrasta tik įvertinant mąstymo originalumą. Nustatyta, kad vyresniųjų klasių mokiniai pasižymi aukštesniu kūrybinio mąstymo originalumu nei mokytojai:

$t(458)=2,196, p=0,029$ .

7. Palyginus kūrybinio mąstymo parametrus (idėjų gausos, lankstumo, originalumo) grupėse pagal lytį, nustatyta, kad moterys (mergaitės) geriau negu vyrai (berniukai) atliko visas kūrybinio mąstymo užduotis ( $p=0,000$ ).

8. Palyginus kūrybinio mąstymo parametrus grupėse pagal tai, kelintas vaikas šeimoje, nustatyta, kad didžiausiais kūrybinio mąstymo rodikliais pasižymėjo pirmasis vaikas šeimoje, kiek mažesniais - antrasis vaikas, dar mažesnius balus surinko trečiasis vaikas šeimoje, ketvirtojo vaiko kūrybinio mąstymo parametrai buvo kiek žemesni negu trečiojo vaiko, o penktasis vaikas šeimoje pasižymėjo pačiais žemiausiais bendraisiais kūrybinio mąstymo rodikliais, tačiau statistiškai reikšmingų skirtumų nebuvo atrasta.

9. Palyginus kūrybinio mąstymo rodiklius vienturčių ir kitų vaikų grupėje nustatyta, kad visi vienturčių kūrybinio mąstymo rodikliai (bendrasis kūrybinio mąstymo rodiklis, idėjų gausa, mąstymo lankstumas, originalumas) yra didesni nei kitų vaikų, ir šie skirtumai yra statistiškai reikšmingi ( $p=0,000$ ).

10. Nustatyti statistiškai reikšmingi ryšiai tarp kūrybinio mąstymo parametrų ir savivertės. Nustatyta, kad kuo daugiau tiriamieji save vertina pagal kriterijų „naujovių mėgėjas“, tuo didesni visi jų kūrybinio mąstymo rodikliai ( $p<0,05$ ), kuo daugiau save vertina pagal kriterijus „talentingas“, „kūrybingas“, „protingas“, „dosnus“, tuo didesnis jų bendrasis kūrybinio mąstymo rodiklis ( $p<0,05$ ), o kuo daugiau save vertina pagal kriterijų „darbštus“ ir „pavydus“, tuo jų originalumas mažesnis ( $p<0,05$ ).

11. Nustatyti statistiškai reikšmingi ryšiai tarp kūrybinio mąstymo parametrų ir psichologinės savijautos mokantis. Tyrimas parodė, kad kuo geresnė mokinių psichologinė savijauta mokantis pagal parametrus „sekasi“ ir „naudinga“, tuo geresni visi kūrybiškumo parametrai ( $p<0,01$ ).

12. Nustatyti statistiškai reikšmingi ryšiai tarp kūrybinio mąstymo parametrų ir vertybinių orientacijų. Tyrimas parodė, kad kuo mokiniams didesnė vertybė yra „galimybė kurti“, tuo didesnis bendrasis mokinių kūrybinio mąstymo rodiklis, o kuo daugiau jie vertina tokias vertybes kaip „pinigai“, „geri santykiai su bendraamžiais“, „geri santykiai su suaugusiais“, tuo mažesnis bendrasis jų kūrybinio mąstymo rodiklis ( $p<0,05$ ).

13. Nustatyti statistiškai reikšmingi ryšiai tarp kūrybinio mąstymo parametrų ir savišvietos poreikių. Nustatyta, kad kuo daugiau tiriamieji nori lankyti kūrybinio mąstymo lavinimo būrelį, tuo didesni visi jų kūrybinio mąstymo parametrai ( $p<0,01$ ). Kuo daugiau mokiniai skaito knygų, tuo didesnis jų mąstymo originalumas ( $p<0,05$ ). Tyrimas parodė, kad kuo daugiau laiko (valandų per dieną) tiriamieji praleidžia prie televizoriaus, tuo

statistiškai reikšmingai mažesni visi jų kūrybinio mąstymo parametrai ( $p < 0,01$ ). Nustatyta, kad kuo daugiau laiko per dieną skiriama kompiuteriniams žaidimams, tuo mažesni visi tiriamųjų kūrybinio mąstymo parametrai ( $p < 0,01$ ), ir kuo daugiau laiko yra praleidžiama kompiuteriu susirašinėjant su draugais, tuo taip pat mažesni visi tiriamųjų kūrybinio mąstymo parametrai ( $p < 0,05$ ).

14. Nustatyti statistiškai reikšmingi ryšiai tarp kūrybinio mąstymo parametru (idėjų gausos, lankstumo, originalumo) ir mokymosi sunkumų įveikimo. Tyrimas parodė, kad kuo didesni mokinių kūrybinio mąstymo parametrai, tuo jiems lengviau mokytis ( $p < 0,05$ ). Tyrimas parodė, kad esama teigiamų, tačiau statistiškai nereikšmingų ryšių tarp kūrybinio mąstymo ir laiko, skiriamo namų darbams.

### **REKOMENDACIJOS**

1. Ugdant mokinius ir mokytojus bei kuriant kūrybinę visuomenę Lietuvoje, svarbu sudaryti piliečių ugdymuisi įvairiais amžiaus tarpsniais edukacines prielaidas, todėl siūloma:

1.1. nuo pat pirmos klasės skatinti mokinių kūrybinio mąstymo lavinimo poreikius įtraukiant mokinius į papildomo ugdymo būrelius (dailės, muzikos, techninės kūrybos ir kt.) bei į įvairius mokslinį interesą skatinančius būrelius (gamtos pažinimo, ekologijos, chemijos ir kt.);

1.2. 5–12 klasių mokiniams steigti specialius kūrybinio mąstymo ugdymo būrelius, kuriuose būtų dėstoma problemų sprendimo metodika, supažindinama su euristikos ir kūrybos psichologijos pagrindais, lavinama kūrybinė vaizduotė, ugdomas divergentinis, analitinis, kritinis ir išradybinis mąstymas;

1.3. visiems mokytojams organizuoti kvalifikacijos tobulinimo kursus, kuriuose jie galėtų lavinti savo kūrybinį mąstymą, o kūrybiškiausius mokytojus parengti vesti specialius kūrybinio mąstymo ugdymo būrelius;

1.4. vyresniųjų klasių mokytojams, dirbantiems su gabesniais vaikais ir suprantantiems, kad jų mokinių kūrybinis mąstymas (ypač originalumas) gali būti aukštesnis, negu jų pačių, mokytis jaustis saugiai, nenuvertinti nei savęs, nei mokinio;

1.5. vyresniųjų klasių mokytojams, dirbantiems su gabesniais mokiniais, siūloma steigti specialius saviugdos kursus, skirtus mokytis dirbti su gabiais mokiniais;

1.6. į bendrojo ugdymo programas daugiau integruoti kūrybinį mąstymą, intuityvumą bei vaizduotę lavinančių pratimų, užduočių, duoti mokiniams atlikti kūrybiškumą skatinančių projektų, leisti ieškoti uždavinių sprendimo ir naujais, nestandartiniais būdais.

2. Kūrybos procesas priklauso nuo daugelio veiksnių, todėl, siekiant ugdyti kūrybišką ir kuriančią asmenybę, mokytojui būtina:

2.1. formuoti mokinių ir savo vidinę motyvaciją kurti, kūrybą vertinti kaip vertybę;

2.2. ugdyti mokinių bei savo pasitikėjimą savimi ir savo mokiniais;

2.3. skatinti mokinius laisvai kurti, atrasti problemos sprendimą naujais, netradiciniais metodais;

2.4. sudaryti mokinių kūrybai palankias sąlygas, kūrybiškumą skatinančią aplinką.

3. Žinodami, kad kūrybiškiausi mokiniai linkę mažiau nusileisti, mažiau paiso autoritetų ir nustatytų taisyklių, linkę mažiau bendrauti ir daugiau konfliktuoti su aplinka, mokytojai turėtų jiems padėti adaptuotis mokyklos bendruomenėje.

4. Mokytojai mokiniams, siekiantiems ugdyti savo kūrybiškumą ir kūrybinį mąstymą, gali patarti mažiau žiūrėti televizijos, mažiau praleisti laiko prie kompiuterio, daugiau skaityti knygų.

5. Žinodami, kad vienturčiai ir pirmieji vaikai šeimoje turi didesnę kūrybinį potencialą, mokytojai šiems vaikams gali duoti daugiau kūrybiškumo reikalaujančių užduočių ir tokiems mokiniams patarti plėtoti savo kūrybinę saviraišką.

6. Mokytojams patartina įvairiomis pedagoginėmis priemonėmis didinti mokinių savivertę ir pasitikėjimą savimi. Savivertės didinimas gali prisidėti prie kūrybiškumo ugdymo.

7. Mokinius, kurie nepasižymi dideliu darbštumu, rekomenduotina nukreipti į papildomo ugdymo būrelius, skatinti juos užsiimti kūrybine veikla, kuri jiems būtų patraukli ir įdomi.



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