

Modelling Students' Creativity Development in Practice of Higher Education in Russia

Olga M. Shentsova*, Nailya A. Kayumova, Tamara V. Krasnova, Tatyana V. Usataya, Dmitriy U. Usatiy and Lyubov V. Deryabina

Nosov Magnitogorsk State Technical University, 38, Lenina Pr., Chelyabinsk Region, Magnitogorsk - 455000, Russia; shenolga@yandex.ru, n.a.kayumova@mail.ru, toma.krasnova.70@mail.ru, usatayatv@gmail.com, usatiydu@gmail.com, savochkinalv@rambler.ru

Abstract

Background/Objectives: Development of a model for students' creativity development as a profession-specific personal quality. **Methods/Analysis:** A toolkit for an ascertaining experiment included observations, questionnaires, interviews, discussions and an analysis. To introduce the integrated model of students' creativity development in a learning process, we used psychological support to students from professors; we had monitoring of transformations of students' creativity from the reproductive to the reproductive and creative one; we made an encouraging and emotionally comfortable environment at a class; there was a joint work of different-age students. At the end of each experiment stage, we had check cross-sections. The process of students' creativity development was evaluated with the ratio method (before, during and after the experiment), and with the method of indicators for time series. **Findings:** Three groups were formed for the experiment: control group (CG) and experimental groups (EG 1 and EG 2). The findings from the experimental activities show that in EG 2, where there had been a totally introduced set of teaching conditions, an average value for students' creativity has increased by 45%, while for other groups, the value has been 35%. **Applications/Improvements:** The comprehensive model has been developed for students' creativity development as profession-specific quality. This model includes gradation of creativity levels, criteria and indicators, as well as the set of teaching conditions. There is the author's definition for the creativity term or the creative process that combines five significant components: motivational, orientational, activity-related, reflective and efficient.

Keywords: Creativity, Creative Process, Educational Process, Learning Process

1. Introduction

With a change to the world's ideology and an educational paradigm in Russia, there has been a recent reevaluation of reform concepts in higher professional education. In this regard, new federal state educational standards of the third generation have been in development, there have been also considerable changes to conditions to the structure and functions of a learning process, based on a competency-building approach, forms, teaching conditions, methods and training aids in higher professional education.

Within the system of modern economic relations, a profession needs such qualities, as a high competency, a

broad profession-specific outlook, a high level of person's technological and cultural training and his/her psychological readiness, an ability to use profession-specific knowledge and skills in a creative way.¹ Therefore, full applications of specialists' basic powers and capabilities in professional activities depend on a number of factors, among which, on the one hand, there is natural human creativity, on the other hand, there is purposeful and systematic education. At the same time, it is assumed that a success of such structured education depends on, firstly, time of its start, and secondly, the way of its organization, thirdly, a level of the personal inherent potential and a degree of its awareness in the learning process.²

*Author for correspondence

The potential as a research subject attracts attention of scientists from different domains. However, a meaning of the term *potential* (related to creativity as the creative potential) is highly controversial and uncertain. One of the major reasons for this is a lack of a single theoretical concept in science, in contrast to philosophy, sociology, natural-science and other sources, the *potentialis* considered in a variety of aspects. As a scientific category, the term *potential* is used with the following meanings: for instance, in physics, this is a value that describes a force field at a given point; in economical and defence-oriented sectors as a set of available resources and capabilities; the concept that describes a wide class of physical force fields (electric, gravitational, etc); broadly, the potential is synonymous to terms denoting sources, opportunities, aids, supplies, which can be used to solve a task, achieve a particular purpose; modern German philosophers interpret the potential as a form of genesis, a stage in personality development.³ From the contents of the mentioned meanings, it follows that the concept of the potential as a physical phenomenon, as reserves of the society and the government and the human potential are not identical.

An analysis of definitions for *the potential* has shown that the concept refers to a number of general scientific categories and is polysemantic. In this regard, interpreting the concept of *the potential*, we relied on such its common and the most important attributes, as the source, opportunities, a set of available funds, reserves, reserves of an individual, in a certain domain, which may occur under certain conditions or be used to solve tasks.

Among the works on the potential, the concept by Kelle is methodologically important, according to which "the potential belongs to a realm of possible things. However, possibilities cannot be accumulated in an endless way. Fully or partially, they have to turn into the reality, that is be implemented in activities - material, intellectual, economical, political, scientific, etc." ⁴, "... as the potential, if it is not implemented or supported in a state of ready (for example, the military potential), makes no sense, and its implementation does not happen automatically." ⁵

The problem of the potential is a subject of numerous research in different domains, disclosing many sides of this phenomenon: intellectual, economical, heuristic, spiritual and creative, demographic, scientific and science-technical.⁶ Among them, we were interested in those that were focused on research of a nature of the human's potential: Avdeeva, Stepanova and Ashmarin^{7,8}, Kagan⁹, Kelle⁴, Petrov¹⁰, Schadilova¹¹, Davies, Jindal-Snape,

Collier, Digby, Hay and Howe¹²; Smith and Smith¹³; Biggs and Nang¹⁴; Sweller¹⁵; Csikszentmihalyi and Wolfe¹⁶; Bazhenov and Luchaninov¹⁷ etc. In their view, the potential has three levels of connections and relationships, revealing its "depth."

Reflection of the past is the first level. The term of *the potential* is close to the concept of *resources* and understood as a set of properties, capabilities, opportunities, accumulated by the system in its genesis, evolvement and ensuring its development. The second level gives us an *idea of the present*. The term *potential* is close to the concept of *reserves*, as an individual has a chance to involve an unused "margin of safety", reveal hidden abilities and apply them to practice. The third level is a focus on the future. The potential serves as a basis for the future development of an individual, when in the course of activities, the individual does not only use existing personal strength and abilities, but also new ones.⁶

All the authors agree that in research on the human potential, it is necessary to take into account a dual nature of an individual as, according to Kagan, a person is, on the one hand, "the highest level of living organisms on the Earth", and on the other hand, "a subject within socio-historical activities and culture."⁹ Therefore, Genisaretsky, Nosov and Yudin argue that the human potential is partly something given to an individual from birth, but it is pretty much formed and develops in socialization.⁸ Kelly's view is quite representative here. He believes that "the concept of "human potential" is holistic and integrative as it includes an anthropological component, reflecting a combination in an individual of the biological and social origin, the individual and social origin."⁴

As a result of the comparative analysis of research on the human potential we concluded that *the human potential is a holistic and integrative combination of nature and social origins in an individual and it is presented as one of default personality traits.*

The research we held allows us to derive a specific methodology to explore and develop the *students' creativity* and schedule a strategy to achieve a goal - training to future professionals. The essence of this strategy depends on a development state of the problem of the creative potential development in education theory and practice-oriented papers; a substantive content of the concept "the creative potential of future specialists as profession-specific personal quality"; a necessary and sufficient set of teaching conditions to develop students' creativity in training.

The second component in the basic concept is adjective *creativity* that represents a qualitative characteristic of the human potential. The problem of creative activity is one of the most explored in science, as people believe that *creativity is an immanent for a person*. Representatives from different domains explore an essence and a nature of creativity in various aspects: they are experts in philosophy, psychology and education, aesthetics, etc; they are devoted to aspects of the creativity phenomenon, focused on a disclosure of individual personality traits that define its psychological specifics in creative works⁶; focused on an attitude towards creativity not so much as a sign of solectness, but as mandatory feature of any person, although inherent for everyone to various degree (Merzlyakov and Fazeli)^{18,19}; on formation of creativity experience as a basic component of the education content in schools of any level (Lerner, Ushachev and their followers)^{20,21}; specifics of the creative experience and personal qualities of students (Kolesnikova, Ponomarev, Yakovleva etc)²²⁻²⁵; socially pronounced specifics of activity, in which creative self-realization of an individual takes place^{26,27}; artistic, scientific and other types of creativity (Gilman, Goncharenko, Savochkina, Shentsova, Yusov, Yakovlev etc.)²⁷⁻³² Thus, these authors, almost in all their papers on creativity, share a belief in human creativity saying that an individual is a creator by nature, that human's creativity can and should be developed.

Based on this assumption, we consider students' creativity development as a process of teaching "control over socialisation for each of them, both as a professional, and a citizen, who is developing and implementing his/her potential in a socially acceptable manner."²⁸ Therefore, a problem of reforms in higher education, improvements of forms, teaching conditions and methods of students training in any domain, requiring from them new, non-standard creative approaches to solving professional problems, is pressing today.

2. Materials and Methods

Methodological reference points given in the works of the above-mentioned researchers, formed the basis for development and refinement of the categorical framework, as well as for the development of the structure-content model of students' creativity development as profession-specific personal quality in a process of organizing their profession-centered training. We define students' (future professionals') creativity as *an integrative dynamic pro-*

fession-specific personal quality, including an amount of individual creative resources given by nature, and psychological developments, acquired in society and culture-related development and vocational training.

A spontaneous manifestation or unawareness of its coming is a characteristic of natural creativity. It is a kind of an act of "inspiration". Knowledge, skills, a creative focus and a career focus understood by a person act as psychological new developments in a person. Therefore, creativity is both a prerequisite and a result of a creative activity. Thus, we are entitled to conclude that, on the one hand, creativity is a natural (immanent) quality of each student; on the other hand, it can and should be purposefully developed in society and culture-related education to the person. The literature review helped us to identify the components that make up the person's creativity:

- 1) *The motivational component* is a backbone component in human creativity structure, which will integrate external conditions (substantive work) with internal conditions (needs: creative purposes and meanings). This component contributes into human activity and determines a direction of his/her creative work. A success of an activity is impossible without available corresponding interests available in a person, his/her needs, motives and an individual's focus.
- 2) *The orientational component* is next component in creativity development that puts tasks for a student: develop inherent creative resources and career. Student's focus on the future professional activity might be presented as follows: focus of himself/herself associated with a need in self-determination, self-development, self-cultivation in the professional field³³; focus on a substantive side of the profession associated with mastered content of the principal professional educational program.
- 3) Motivational and orientational components of creativity are implemented through *the activity-related component*, leading component in the creative and professional development of students as human and professional values only become the property of an individual if they are got in cognitive and transformative activities. Therefore, in various activities, students master techniques to implement these activities with a consistently growing difficulty degree.
- 4) *The reflective component* is formed on the basis of motivational, orientational and activity-related components of creativity. The content of the reflective

component of students' creativity includes specific skills: analyze your own feelings (creative state), monitor the slightest progress in creativity development and emerging personal and psychological achievements (achieved results).

5) *The resulting component* is a summarizing component of individual's creativity as an outcome, an index of achieved mastery level. The resulting component of creativity allows estimating feasibility of the set goal, a quality of a training program, validity of criteria to evaluate a level of students' creativity development.⁶

Everyday professional training and the made review of literature has given us an opportunity to state a *hypothesis for the research*: efficiency of students' creativity development as profession-specific personal quality will be ensured with the introduced integrated model of students' creativity development as profession-specific personal quality (Figure 1).

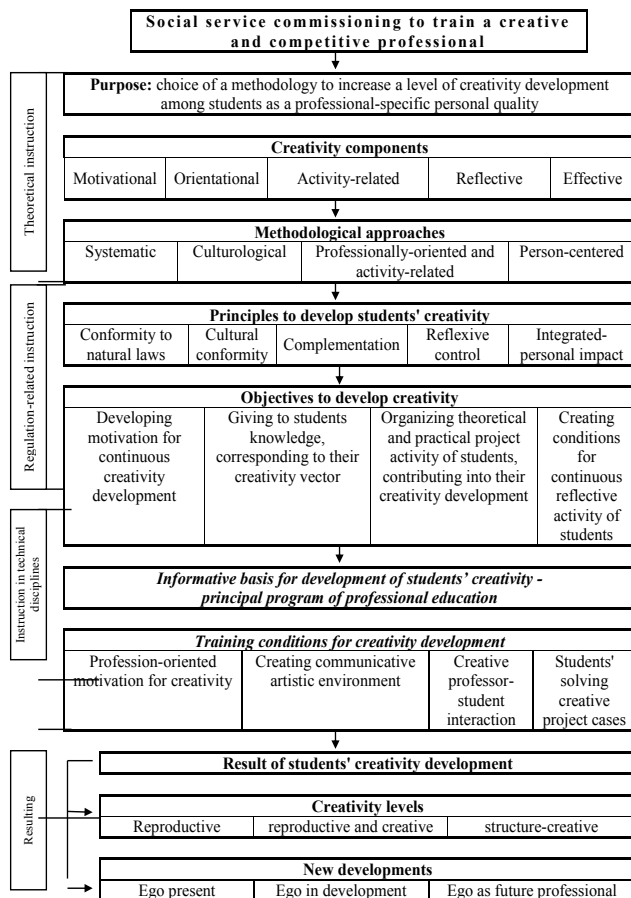


Figure 1. Model of students' creativity development as profession-specific personal quality.

We have identified the following levels of creativity development:

- Level one (low) – reproductive;
- Level two (middle) – reproduction-creative;
- Level three (high) –structurally-creative.

We have developed *the model of students' creativity development*, for which a determining basement is social service commissioning for a creative individual (Figure 1). The basis for such model included the findings from the ascertaining experiment held by us. They show that every student upon enrolment to a college has already had a certain level of creativity and that creativity development like personal development in general depends on learning, in a form of academic and employment training for students.

3. Experiment

3.1 Principles and Data

In the teaching experiment, implemented in the framework of our research, 1-5-year student took part from G.I. Nosov Magnitogorsk State Technical University (Russia) and Magnitogorsk State University in Magnitogorsk (Russia).

Pilot works were arranged and carried out in vivo, adhering to the requirements that ensure getting the accurate data: homogeneity of the research subjects; the same experimental conditions; a necessary and sufficient number of observations; appropriate methods for mathematical processing of the experimental findings.

The leading principles of the experimental work were the holistic research for the phenomenon under investigation, continuity, phased development of students' creativity and a success of activities. The experiment toolkit included the following research methods: lesson observation, questioning, talk and interview, analysis, etc.

Three groups were formed for the experiment: one control (CG) and two experimental groups (EG 1 and EG 2). In CG, the creativity development was carried out in a usual learning process. In EG 1, the creativity development was carried out with partially introduced teaching conditions within the developed model. In EG 2, the creativity development was carried out with totally introduced set of teaching conditions for the developed model to develop students' creativity as profession-specific personal quality.

Thus, having compared the findings got from the control and experimental groups, we verified the research

hypothesis, i.e. implementation of the integrated model ensures the efficient development of students' creativity as profession-specific personal quality.

3.2 Methods to Implement the Set of Teaching Conditions

3.2.1 The first condition

To implement the first teaching condition of "profession-oriented motivation for creativity", the following methods were used:

- psychological and practice-oriented support to a student by a professor to resolve his/her internal conflicts between "I want" and "I can";
- teaching psychological and emotional assistance to students to overcome a "barrier of failure";
- harmonization of a student's personality through development of his/her capacities for self-expression and self-knowledge in creative work, objectifying in themselves their feelings, experiences and a creativity state;
- monitoring a consequent qualitative transformation of the level of students' creativity from reproductive to reproductive and creative, and then to constructive-creative, describing three stages in their increasing awareness of qualitative changes to knowledge, skills and their creative focus from "Ego present" to "Ego in development" and "Ego as future professional".^{6,20}

3.2.2 The Second Condition

To implement the second teaching condition (*making the communicative creative environment*), the following methods were used:

- making an appropriate environment, interior, encouraging a students' attitude for imagination, fantasy (object-thing aids and well-considered interior at a classroom);
- emotional appeal of a class (verbal means of communication: discussion, debate, talk, visual aids (watching movies, slides, presentations, insight); practice-oriented aids (entertaining art, project tasks and exercises, such as the creative time or the competition of ideas);
- joint work of different age-students as a prerequisite to make the professional community;

- transfer of students' experience exchanges into the Internet as a way to share experiences in a convenient way and expand a circle of friends with the same interests.^{30,34,35}

3.2.3 The Third Condition

To implement the third teaching condition "creative interaction between professors and students", the following methods were used:

- co-creation between a professor and a student (implementing joint creative projects);
- participation of students together with professors in cultural events (organizing and visiting exhibitions, recitals, master classes, etc.);
- participation of students and teachers (as an object to be followed) in creative competitions and exhibitions.

3.2.4 The Fourth Condition

To implement the fourth teaching condition saying, "students' solving problematic creative cases", the following methods were used:

- in the learning process, students do assignments aimed at formation and development of independent creative work skills³⁶;
- activation of creativity to search for innovative solutions, creating conditions for self-actualization,
- self-development of student's personality.³⁷

Table 1. Criteria and indicators of students' creativity development as a profession-specific personal quality

Criterion	Indicator
Focus on creativity	1) knowledge of creativity specifics
	2) attitude towards creativity
Proactive approach to master creativity	3) involvement in creativity
	4) enthusiasm for creativity
	5) independence in mastering creativity
Readiness for creativity	6) teamwork skills, team role
	7) ambition for creative search and research
	8) ambition for solving problematic situations
	9) desire for a positive outcome of creativity

3.3 Criteria and Indicators

In the experiment, we developed and piloted a diagnostic apparatus that includes a group of developed criteria and indicators for creativity, as well as efficiency levels for proposed teaching conditions (Table 1).

4. Results

Diagnostics of qualitative and quantitative changes to students' creativity development was performed in a form of checkcross-sections held at an end of each stage. Results of students' creativity development were assessed using the following methods:

1. Ratio method (students' creativity development by quality of research subjects that are at one or another development level at the beginning and during the experiment);
2. To define development dynamics for each criterion in experimental work, we used the method of indices for time series:

Average index Avg, reflecting a quantitative estimation (in%) for a value of the highlighted indices was calculated by formula:

$$C_p = \sum_{i=1}^k \frac{q_i}{n} \times 100\% \quad (1)$$

where q_i – number of research subjects, who are at a certain level of creativity development; n – total number of research subjects; k – number of indices.

The index of absolute growth rate G , representing a difference between the initial and the final value for the criterion, indicator in question, was calculated by:

$$G = I(\text{init}) - I(\text{fin}) \quad (2)$$

where $I(\text{init.})$ – is initial index value; $I(\text{fin.})$ – is final index value.

We defined efficiency with the field research by performance factor, calculated by:

$$P = \frac{m}{n}, \quad (3)$$

where m – is actual score; n – is the highest possible.

The rule to define the performance is shown in Table 2.⁷

The level of creativity development for each research subject was defined by formula:

$$S = \frac{I_1 + I_2 + I_3 + I_4 + \dots + I_9}{9}, \quad (4)$$

where $I_1, I_2, I_3, I_4, \dots, I_9$ – are estimates that match values of creativity indices 1,2,3,4, ..., 9.

Creativity development levels and matching scores:

1st level (high) = $S \geq 2.5$

2nd level (middle) = $1.5 \leq S < 2.49$

3^d level (low) = $S \leq 1.49$

The ascertaining experiment shows the following findings intended to identify an initial value of students' creativity (Figure 2)

Table 2 shows the method to determine an efficiency level for creativity development. Following this method, the calculation of results has shown the higher value of the efficiency factor at the experiment end, saying of the efficient impact of highlighted teaching conditions on students' creativity development.

Figure 2 says that the analysis of findings from the survey and the observation have shown that the majority of students (CG-80%, EG1-80%, EG2-55%) are at the average (reproductive and creative) level of creativity development. The minority (CG-15%, EG1-20%, EG2-35%) is at the low (reproductive) level and the least part of students (CG-5%, EG1-0%, EG2-10%) is at the high (constructive-creative) level.

Table 2. Values of performance factor

Value of performance factor (Pf)	Performance levels
$0.9 \leq P < 1.0$	Ideally efficient (high)
$0.8 \leq P < 0.9$	Efficient (middle)
$0.7 \leq P < 0.8$	Minimally efficient (low)
Less than 0.7	Inefficient (very low)

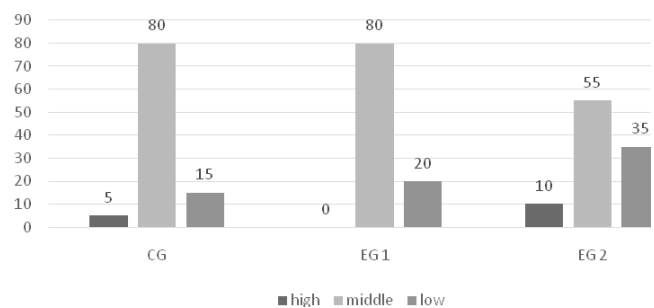


Figure 2. Findings from research to define initial students' creativity.

Figure 3 shows the findings from the introduction process for the model to develop creativity, according to which an absolute growth for the index at the high level of creativity development among students from CG was 35%, among students from EG1, it was 35%, among students from EG2, it was 45%.

The average development dynamics for each indicator of creativity development by experimental group is given in Table 3, which shows a relative gain at the high level and a decline in indices values at the low level.

5. Discussion

The problem of students’ creativity development as a profession-specific personal quality is pressing in higher education in view of qualitative changes to the education system, caused by social service commissioning and an insufficient theoretical and practical development of the issue. A review of available information and scientific development of the mentioned problem in teaching practice

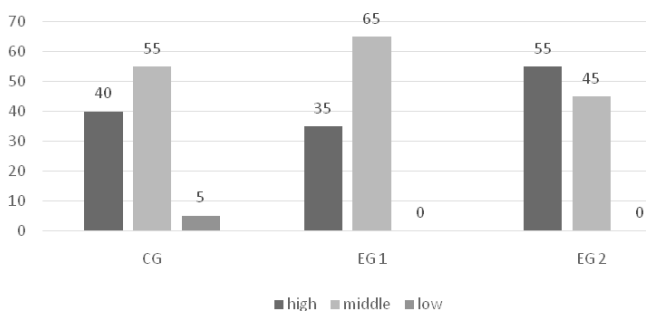


Figure 3. Findings from research to define students’ creativity at experiment’s end.

shown a need in a targeted development of students’ creativity as a profession-specific personal quality.

The structure-conceptual model proposed by the authors to develop students’ creativity as a profession-specific personal quality might be successfully applied in various fields of occupational training program at a college level. The research findings are of practical relevance and can be used in practice of professional education.

The further research might be in the following areas: make a model to develop the students’ scientific capability, make a model to manage the process of creativity development, develop a package of today’s diagnostic techniques to identify a level of further development of the students’ creativity at each stage of occupational training.

6. Conclusion

The findings from the experimental work show that in EG 2, in which the developed model had been applied in full together with the set of teaching conditions, the students’ average creativity development index has increased by 45%, while in other groups its value has been 35%. Therefore, we conclude that the completed research in general has confirmed the hypothesis put forward earlier.

A many-side analysis of the content and the structure of creative and occupational training for students has revealed a possibility and a need in creativity development as a profession-specific personal quality. Therefore, the learning process modelling was based on the structure-conceptual model, which allowed us to design a consistent gradual qualitative transformation of students’ creativity from reproductive to reproductive and creative,

Table 3. Students’ creativity development index at experiment’s start and end, %

Experiment’s start										
Indicator levels	Indicators									Avg
	#1	#2	#3	#4	#5	#6	#7	#8	#9	
High	43	22	14	28	15	6	0	0	15	15.9
Middle	51	27	65	37	60	55	60	10	75	48.9
Low	6	51	20	35	25	39	40	90	10	35.2
Experiment’s end										
Indicator levels	Indicators									Avg
	#1	#2	#3	#4	#5	#6	#7	#8	#9	
High	82	46	67	67	45	43	28	17	75	52.2
Middle	18	54	32	30	55	50	72	83	25	46.6
Low	0	0	1	3	0	7	0	0	0	1.2

and then to top one, i.e. structurally-creative. At the last-mentioned level, students manifest their desire to creativity self-development; there are also new psychological developments that also describe three stages instudents' creativity development, i.e. from "Ego present" to "Ego in development" and "Ego future professional", represented in students' awareness of qualitative changes to knowledge, skills and the personal creative focus.

7. References

- Kim HJ, Lee H, Youn J, Eom S, Lee J. A Study on college students' demands for creativity and personality education as part of the general education curriculum. *Indian Journal of Science and Technology*. 2015 Apr; 8(S8):29–36.
- Avdeev PB, Dugarova DC, Starostina SE. Improving the quality of professional educational programs of college education against modern social and labor relations. *Indian Journal of Science and Technology*. 2015 Dec; 8(10):1–9.
- Lexikon K. A–Z Das Wissen unserer Zeit immer auf dem neuesten Stand-Munchen. Oroemersche Verlagsanstalt, Th Knaur, Nachf. 1999; 710 pp.
- Kelle WJ. Human potential and human activity. *Humanus*. 1997; 6:5–14.
- Frolova IT. Human potential: experience of an integrated approach. Institute of Human RAS. Editorial URSS. 1999.
- Kayumova NA. Development of students' creativity at teaching vocational school with tools of graphics. Magnitogorsk State University: Magnitogorsk. 2003; 198 pp.
- Avdeeva NN, Ashmarin II, Stepanova GB. Human potential in Russia: Risk Factors. *Humanus*. 1997; 1:19–33.
- Genisaretsky IO, Nosov NA, Yudin BG. Concept of human development: starting ideas. *Humanus*. 1996; 4:5–21.
- Kagan MC. Human Activities. Political Literature: Moscow. 1974.
- Petrov VM Human potentials and their distribution. *Humanus*. 1998; 6:5–21.
- Schadilova KA. Human potential as global problem. *Humanus*. 1998; 6:181–83.
- Davies D, Jindal-Snape D, Collier C, Digby R, Hay P, Howe A. Creative learning environments in education: A systematic literature review. *Thinking Skills and Creativity*. 2013; 8:80–91.
- Smith JK, Smith LF. Educational creativity. In: Kaufman JC, Sternberg RJ, editors. *The Cambridge Handbook of Creativity*. Cambridge University Press: USA. 2010; 250–64.
- Biggs J, Nang C. Teaching for quality learning at university; what the student does. The Society for Research into Higher Education and Open University Press: New York. 2011
- Sweller J. Cognitive bases of human creativity. *Educ Psychol Rev*. 2009; 21(1):11–9.
- Csikszentmihalyi M, Wolfe R. New conceptions and research approaches to creativity: implications of a systems perspective for creativity in education. In: *The systems model of creativity: the collected works by Mihaly Csikszentmihalyi*. Springer-Verlag: Berlin Heidelberg. 2015; 161–84.
- Bazhenov RI, Luchaninov DV. Use of blended learning elements for formation of a humanitarian student's creative initiative at learning modern information technologies. *Life Science Journal - Acta Zhengzhou University Overseas Edition*. 2014; 11(11s):371–74.
- Merzlyakova MG. Teachers creativity development in design of person-centered education system in high school. St. Petersburg: USA. 1995.
- Fazeli SH. The role of personality traits in the choice and use of the compensation category of English language learning strategies. *Indian Journal of Science and Technology*. 2012 Jun; 5(6):2938–44.
- Lerner IY. Didactic bases of training methods. *Pedagogics*: Moscow. 1991.
- Ushachev VP. Creativity in education system. *Prometheus*: Moscow. 1995.
- Kolesnikova EV. Aesthetic self-education and creativity development of future engineer. Kyiv. 1989.
- Ponomarev YA. Research on human creativity. *Psychological Journal*. 1991; 12(1):3–11.
- Leontiev DA. Personal potential: structure and diagnostics: collective monograph. Smysl: Moscow. 2011.
- Yakovleva EL. Psychology of Creativity Development. Flinta: Moscow. 1997.
- Wolfson SI. Professional creativity classes. Publishing Center Academy: Moscow. 1999.
- Gilman RA. Theory and practice of creativity development of student in system of higher art teaching education. Magnitogorsk State University: Magnitogorsk. 2001.
- Goncharenko NV. Genius in art and science. Publishing house Iskusstvo: Moscow. 1991.
- Savochkina LV. Theoretical and methodological bases to generate college students's readiness to graphic activity. Magnitogorsk. 2010.
- Shentsova OM. Development of interest in art and creativity in architecture students. Magnitogorsk. 2003.
- Yusov BP. Three levels of artistic imagination: three worlds of life, three worlds of art. In: *Culture, Art and Education: Problems, Prospects of Development*. Smolensk: SGII, 1999.
- Yakovlev VA. Dialectics of creativity in science. MSU: Moscow. 1989.
- Janagam D, Suresh B, Nagarathinam S. Efficiency of task based learning and traditional teaching on self-regulated education. *Indian Journal of Science and Technology*. 2011 Mar; 4(3):308–12.

34. Krasnova TV. Social design as a means of creating communicative educational environment. *Sworld Collected Scientific Papers*. 2012; 17(1):26–30.
35. Kayumova NA, Mashinskaya MS, Shentsova OM, Savelyeva OP, Krasnova TV, Demenev DN. The development of interest to the artistic and creative activity as the basis of future bachelor professional self-determination in the field of architecture, art and design. *The Social Sciences Medwell Journals*. 2015; 10(9):2234–39.
36. Venkataramanan M, Prema TS, Nandini SV. Knowledge management through distance education. *Indian Journal of Science and Technology*. 2011 Mar; 4(3):2234–39.
37. Usataya TV. Development of artistic and design activity in vocational training of college students. *Magnitogorsk State University: Magnitogorsk*, 2004.