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Creative Abilities of Students with Dominant Cognitive Style

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Abstract

The article examines the problem of creativity development, taking into account students' cognitive styles. We studied theory assumptions for cognitive styles when providing psychological and educational support for the development of a person's creativity, and presented the analysis of parameters of cognitive styles. We presented arguments that a person's cognitive style has a set of invariable constituents that manifest themselves in perception, processing, and use of information, as well as in variable ways to use the information space. We revealed the content characteristics of the cognitive style. We found that the majority of participants were characterized by field dependence and integrity and proved that parameters of cognitive styles are interrelated with self-regulation and creativity. In case of field independence and differentiation, the biggest changes were observed in the development of modeling, flexibility and curiosity. Prevailing field dependence and integrity had a positive effect on the development of emotional sensitivity (empathy), intuition and a creative attitude towards a profession. Students with different parameters demonstrated differences in the development of creativity components. The research provides empirical evidence for using psychological and educational support to develop students' creative abilities. The authors highlighted the possibilities of psychological and educational support for creativity development, taking into account students' cognitive styles.

Keywords: cognitive style, field dependence, field independence, differentiation, integrity, creativity, psychological and educational support.

1. Introduction

Educators pay much attention to students' creativity development. It is due to constantly changing living and working conditions, which necessitates teaching/learning organization in such a way that students can project outcomes when studying and after graduation. The issues of

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creative abilities development are not new. They have been analyzed by many authors. But any recommendation can be ineffective if a person's cognitive sphere peculiarities are not considered. It is here that incoming information is processed. Considering a cognitive style as a way of perceiving and processing information, which is unchanged throughout life, we can talk about characteristics that can influence the manifestation and development of creative abilities. We agree with Mamedova et al, who define a cognitive style as individual differences in information processing, and types of people, depending on the characteristics of the cognitive sphere (Mamedova, 2016). Each person is characterized by such parameters of working with it, which not only indicate creative abilities in a particular area, but also determine the characteristics of the ideas generated in accordance with their cognitive styles.

Creativity is a concept that includes personality traits and inclinations in specific activities. Invariably, creativity is included in every group related to creative work. In our study we focused on creativity as an element of creative abilities.

We agree with Ilyin, who considers creativity as a systemic (multilevel, multidimensional) mental concept. It includes intellectual potential and is associated with motivation, emotions, the level of aesthetic development, existential, communicative parameters, competence, etc. (Ilyin, 2012). Creativity is demonstrated in all spheres of activity and at different levels (personal, procedural and productive) (Ilyin, 2012).

Creativity as a process reveals itself in stages and implies:

1. A motive stimulating the creation of a new product;
2. Imitation and use of standard ways of doing things;
3. Transformation of the available methods in accordance with individual characteristics and the introduction of personal experience;
4. Harmonization and individualization of the result.

To understand the role of creativity in professionally relevant traits of perspective specialists of a "person-to-person" sphere, we analyzed its components. Barysheva describes creativity through emotional (empathy, lability, emotional thesaurus), intellectual (intuition, divergence, etc.), aesthetic (sense of style, sense of humor, etc.), communicative and existential parameters (Barysheva, 2012).

Vishnyakova views creativity as a personal characteristic, a creative process, and a result (Vishnyakova, 1996). The author considers creativity as a problem sensitivity and openness to new things. It implies the destruction or change of habitual forms of behavior and methods of activity (Vishnyakova, 1996). The author singles out the following components of creativity: creative thinking, curiosity, originality, emotional sensitivity (empathy), sense of humor, intuition, imagination and attitude to the profession. In this paper, we analyzed creativity through the structure proposed by Vishnyakova.

Creativity development is viewed from different positions. The problem is rather developed both in Russian and foreign literature. Allinson and Hayes presented empirical evidence for an intuitive-analytical dimension of a cognitive style (Allinson, Hayes, 1996). Despite the empirical data that emphasize the effectiveness of creativity development in conjunction with cognitive sphere (Hayes, Allinson, Dietrich, etc.), there are issues that have received little attention. We will consider the ways of creativity development, taking into account participants' cognitive-style organization (Dietrich, 2004).

According to Narcissova, "cognitive style" has two definitions. In a narrow sense, it is a way of solving problems. Broadly it implies stable individual "differences in the organization of information selection and processing" (Morozova, 2009). Witkin considers a cognitive style as "stable symptom complexes, personality-related individual and age-related differences in cognitive activity" (Morozova, 2009). Witkin and Oltman proposed five criteria for distinguishing styles and abilities: 1) abilities are associated with the level of achievement, while style characterizes the way an activity is performed; 2) a style is bipolar, an ability is unipolar; 3) abilities have a value context, value judgments are inapplicable to styles – in other words, both poles of any style are equivalent from the point of view of the productive aspects of activity; 4) a style is stable over time; 5) a style is steadily manifested in different conditions, while an ability is characterized by specificity in relation to a certain type of activity and can change over time (Morozova, 2009).

Summarizing the approaches of Kestrin-Gloger, Petzold and Nickel, Wordell and Royce, cognitive styles can be classified into three groups: formal, thematic, and mixed ones. These groups

include cognitive and affective components.The authors group all styles as cognitive (reflect only the cognitive aspect), affective (include emotions, values and personality traits) and cognitive-affective (reflect the influence of emotions and the personal aspect on cognitive activity) (Shkuratova, 1998).

Armstrong, Rayner and Peterson define the cognitive style as an individual peculiarity that characterizes the way of information processing (perception, organization and analysis) using various mechanisms and structures of the brain (Armstrong et al., 2012). Ehrman and Leaver classify cognitive styles in terms of two higher-order constructs such as *synopsic* and *ectasis.* These constructs can be understood as bipolar phenomena, which, on the one hand, reflect an integral process, and on the other, describe the nature of all the elements. The complex nature of the model provides a variety of combinations of style organization, providing increased awareness of supervised learning (Ehrman, Leaver, 2003).

Kholodnaya defines them as "individually unique ways of processing information about one's environment in the form of individual differences in perception, analysis, structuring, categorization, and assessing what is happening" (Kholodnaya, 2004). The author distinguishes the following parameters of cognitive styles: field dependence/independence, narrow/wide range of equivalence, narrowness/breadth of categories, flexible/rigid cognitive control, tolerance to unrealistic experience, focusing/scanning control, leveling/sharpening, impulsivity/reflexivity, cognitive simplicity/cognitive complexity (Kholodnaya, 2004).

We agree with Volkova and Gusev, who state that current research is characterized by understanding the functional significance of a cognitive style as a psychological means of regulating cognitive activity and a person's adaptation to its conditions.In general, cognitive styles can be viewed as a system that regulates the relationship between the individual psychological characteristics and environmental demands (Volkova, Gusev, 2016).

Of all the variety of parameters found in literature, we will analyze the two: field dependence and field independence and differentiation and integrity. The choice is due to the data related to creative abilities (Paliy, 2013). Field dependence – independence (FD, FI) was identified in 1954 by Witkin as an indicator of field differentiation. In case of field dependence, the perception of the background of the field and the need for a longer time for the allocation of a stimulus in this field are dominating. A complex image (object) acts as a perceptual field, and its detail is a stimulus. Thus, the perceptions of field-dependent people "are predominantly holistic, global and undifferentiated" (Shkuratova, 1994). Field-independent people are characterized by opposite: they are able to quickly overcome the influence of the background (context) and highlight the necessary element, which is achieved due to the ability to control visual perception and rely on internal evaluation criteria (Shkuratova, 1994).

The cognitive style is constant and manifests itself in all human activities, in uncertain situations its role in thinking increases. Field-dependents are more guided by information coming from others, while field-independent people ignore other people's opinions and prompts. They are guided by their own understanding of the situation. In rest, the reaction to external information does not differ in representatives of these groups (Morozova, 2009).

Differentiation and integrity reflect the perception and processing of information as a generalized and whole picture, or fragmentarily, with isolated components. The parameter is characterized by the generalization of the "image of the world", which consists in the abstractness or concreteness of the semantic field of the individual, the emotional saturation of cognitive processes, and the activity of cognitive processes (Morozova, 2009).

Depending on the dominant pole and the parameter level, there are several strategies of Differentiation/Integrity. Integral-theoretical strategy is characterized by the fact that information is assessed in a generalized, abstract way. The situation is assessed as a whole, without taking into account an emotional component and activity opportunities.

Integral-active strategy implies that general features are also assessed in a situation, but the dynamics of their development is also taken into account.

Integral-emotional strategy is characterized by the fact that an emotional component, which is stable, is added to the assessment of the situation.

Differential-theoretical strategy is determined by the fact that the situation is assessed statically, but there is a selection of structural components in it.

Differential-activity strategy is characterized by the fact that each component in the structure of information is considered and evaluated in dynamics; an integral picture is not formed.

Differential-emotional strategy has features associated with the fact that the situation is given emotional force due to the introduction of a plot or the use of emotionally colored definitions (Lyatetskaya, 2014). She also singles out a mixed strategy, in which the components of the above mentioned ones are combined in different variations (Lyatetskaya, 2014).

2. Materials and methods

In accordance with the aims, we developed and conducted a study of psychological and educational support for the development of students' creative abilities, taking into account the dominant cognitive style. When designing the study, we outlined the general organization of the study, including the type and methods of consistent search for answers to the questions (Breslav, 2010).

The study was done in two stages. At first, we selected appropriate diagnostic procedures and measured the primary level of target characteristics. At the second stage, we developed and implemented the technology – psychological and educational support, and evaluated its effectiveness with diagnostic tools (Moroshkina, 2016).

To gather psycho-diagnostic information we used the following measures. To measure the level of creative abilities development we used Vishnyakova's "Creativity" test. The validity of the method is proved in the author's dissertation. The method shows the presence of significant correlations with other tests, which makes it possible to use it to measure creativity (Vishnyakova, 1996). It contains 80 questions and allows determining the level of development of the following components: creative thinking, curiosity, originality, imagination, intuition, emotional sensitivity (empathy), sense of humor, creative attitude to the profession. Each component is represented by ten questions. The assessment of the component is measured in percentage. "Creative thinking" manifests itself in the variability of working with information or literature: thinking through details, predicting the consequences of one's decisions, etc. "Curiosity" reflects an individual's desire to obtain more information, on the basis of which something new can be created. Originality is defined as a desire to transform and improve. Imagination indicates the development of a person's imaginative thinking, relying on which, s/he mentally transforms information.

Intuition is defined as an important component of creativity, characterized by the ability to predict events and trust feelings. Emotional sensitivity is considered through the manifestation of empathy as sensitivity to current events. A sense of humor is based on the ability to see the comic in information and events, as well as the degree of self-acceptance, which allows taking personal jokes objectively. Another important component is a creative attitude to the profession, which implies a willingness to take risks and spend much time on professional self-development without succeeding in this field.

To study field dependence – field independence, we chose Gottschaldt's Group Embedded Figures tests. To determine differentiation/integrity we used a test, consisting of 15 plot pictures, sequentially presented to a participant. Dubnikova and Volkova conducted a quality check of psycho-diagnostic techniques for identifying cognitive style features for their reliability and validity. According to the results, the techniques have a sufficient level of validity (Dubnikova, 2017). It consists of 30 figures, which depict complex geometric shapes that embed simple forms. A participant is asked to find simple forms in complex ones. When completing the task, the total time spent on the search for 30 figures is taken into account. Depending on the task correctness and the time spent on completing it, it was concluded that there is FD/I parameter. The technique is based on the assumption that field dependent people spend more time on solving tasks assigned to them. At the same time, FD and FI people can correctly determine all the simple forms enclosed in complex ones, and can make mistakes. Field-independent people, on the other hand, quickly find all the necessary forms and make minimum mistakes. There should be 2.5 or more times correct solutions than the amount of time spent on looking for forms.

The procedure with "15 plot pictures" was the following: after examining each picture, the participant was to describe what was depicted in it. An important requirement was the absence of instructions that could influence the participant's story. Before each picture presentation, a participant was asked one question: "What is shown in the picture?" When determining the parameter of cognitive style, the degree of detail in the descriptions given by respondents, as well as the frequency of detailed stories, were taken into account. If a participant gave general

characteristics of the objects in 70-100 % of cases, then Integrity was inherent. If the description contained a lot of details, the participant's story was in detail in 70-100 % of cases, then we could talk about Differentiation.

The study was carried out in the institute of education, Kemerovo state university. There were 100 participants in two randomized groups (50 people each) tested before and after the exposure. Randomization makes it possible to exclude the influence of participants' individual characteristics on the result, since the participants have an equal opportunity to participate in the experiment. One group is experimental (on which the studied influence is exerted) and the control group is a group of "natural development" (the participants are not exposed to any influence, but were retested after the same time as the experimental group. Groups were similar in gender and age. The respondents were 19-20 years old.

Quantitative and qualitative analysis was carried out using the methods of mathematical statistics (t is a criterion for dependent samples). The reliability of the mathematical calculations was checked using the Statistica 6.0 program.

3. Results

The empirical data obtained in the course of the experiment were analyzed using the methods of mathematical statistics.To interpret the results, we used three groups according to the level of values: low, medium and high. When interpreting the results obtained by "Creativity" test, values are defined as low if they are presented in the range of 0-30 points, values from 40 to 70 are considered average, and results in the range of 80-100 points are considered high.

The analysis of the average values obtained by the measures indicated the presence of integrity and field dependence in the majority of the participants. There were 24 students with differentiation and 76 students with integrity. By the second parameter, 32 students were field independent and 68 were field dependent. Consequently, we can say that the students are inclined to perceive information holistically, without focusing on details. In addition, the participants found the fact of accomplishing a task and its quality to be important. Quality means that the task was almost up to the requirements.

Table 1. Average values of creativity among students with different cognitive styles

Creativity parameters	Average values				Differences
	Field dependence	Field independence	Integrity	Differentiation	
	1	2	3	4	
Creative thinking	67.3	75.3	67.4	75.3	1-2, 3-4
Curiosity	57.8	58.7	60	51.6	1-3, 1-4
Originality	65	74	64.4	75	1-2, 3-4
Imagination	45.7	51.6	48.7	48.6	1-2
Intuition	63.5	64	61	68	1-4
Emotional sensitivity	72	73	74	79	1-4

According to the data presented in Table 1, significant differences were found in creative thinking in participants with different cognitive styles. Values significantly differ in groups with dominant FD and FI ($t = 2.71$, variance = 98 at $p < 0.05$) and in groups with dominant integrity and differentiation ($t = 2.71$, variance = 98 at $p < 0.05$).

Significant differences in curiosity were obtained in the non-polar profiles of field dependence and integrity ($t = 2.21$, variance = 142 at $p < 0.05$) and differentiation ($t = 2.54$, variance = 92 at $p < 0.05$).The findings are comparable with the data presented in Bigg's studies, who defined style as an approach to learning, problem solving, or life in general (Biggs, 2011).

Significant differences in originality are observed in participants with different cognitive styles. The value is statistically significantly higher in FI group compared with FD group ($t = 2.87$, variance = 98 at $p < 0.05$) and in integrity group, compared with differentiation group ($t = 2.87$, variance = 98 at $p < 0.05$).

Significant differences in Intuition were obtained in the non-polar profiles of FD and Differentiation ($t = 2.54$, variance = 92 at $p < 0.05$).The findings are comparable with the data presented in the studies of Sternberg, who put forward the concept of styles as choices or preferences (Sternberg, 2011).

Having analyzed the data, we can give the following characteristics to the students' creative abilities with various cognitive-style organization.

Field dependent students mainly rely on the experience and external clues that can be set by the conditions of perception and can be typical of any group of situations. Overcoming external reference clues or conditions of perception is difficult for them and requires a lot of effort, usually preliminarily organized. In situations of uncertainty, they rely on someone else's opinion and look for support. If a creative process is attributed to uncertainty, then it can be assumed that such students are inclined to fully or partially copy samples or repeat their own good ideas several times. Learning progress largely depends on its organization. If it is necessary to reproduce topics presented in literature and a teacher chooses an authoritative teaching style, FD students will be more successful than their field-independent counterparts. When being given most of the responsibilities, they are less successful.

Students with dominant integrity tend to perceive events holistically. When comprehending an event, they select a minimum number of objects and react to the situation as a whole. In this regard, emotional reactions are fast and relatively stable.

FI students feel the need to produce new ideas, but they do not fully realize the possibilities of realizing this need. They demonstrate interest in a narrow range of issues and tend to ignore the information that goes beyond it. They have a good imagination about professional tasks, but have difficulty using imagination to predict results and possible difficulties in it.

Students with dominant Differentiation are characterized by segmentary perception of facts and events. Their world picture is fragmentary. When considering and comprehending an event, they highlight a large number of objects and often do not demonstrate consistency of ideas. They have a large emotional repertoire, but are not able to manage it. Emotional sensitivity ranges from overreaction to stiffness and extreme rationality.

Based on our findings, we developed a program of psychological and educational support. According to Krasnoryadtseva, psychological and educational support is "the creation of special conditions under which young people acquire (or expand) the experience of transforming their personal potential and the opportunities of environment (incl. academic) into personal learning resources as the process of self-creation" (Krasnoryadtseva, 2007). We focused not on the program activities, but on how they are interpreted by a student.

As a result of the program, the following changes were expected:

1. Understanding one's capabilities;
2. Correlation of capabilities with the environment (incl. academic one);
3. "The ability to work with one's own potential and the potential of the environment to create an innovative product" (Krasnoryadtseva, 2007).

During the formative experiment, we implemented measures aimed at developing students' creativity by involving them in solving creative tasks consistent with their real activity. There were three kinds of tasks: generating new ideas, increasing the interest in information by turning it into personally significant, increasing empathy and emotionality through solving personally significant problematic tasks. The use of different tasks, the successful fulfillment of which depends on the dominant parameter of cognitive style, allowed creating conditions conducive to the development of these parameters.

For differentiation-integrity, the following tasks were proposed:

- To prepare a report based on given one or several similar sources (for integrity) and on several different sources (for differentiation);
- To make up mind maps;
- To analyze literature and to compare it with scientific data, etc.

To create conditions for FD/I, we chose similar tasks, but the students were asked to choose one of the options for their fulfillment, i.e. they were to analyze factors that promote or hinder creativity development. Some students were to prepare a report, considering the information available in literature (for field-dependents), while others acted as opponents and offered alternative views, presented in other sources or based on personal experience (for field-independents).

At the end of our program, we again conducted a psycho-diagnostic study. The findings after processing the data using the Student's t-test for dependent samples showed changes that occurred between the first and second measurements (Table 2).

Table 2. Changes in the mean values of the components of creativity and self-regulation

Indicator	Average values		Students – t-test	p
	Primary diagnostics	Formative stage		
Creative thinking	71.36	75,91	-2.71	0.05
Imagination	48.64	63.64	-6.69	0.00
Emotional sensitivity (empathy)	75.00	80.91	-4.63	0.01

In our opinion, the increase in creative thinking values may be due to an increase in the degree of awareness of the creative process ($t = -2.71$, variance = 98 at $p < 0.05$). In this case, the participants strive to comprehend the peculiarities of the creative process. The students were more result-oriented and did not seek to understand the peculiarities of the creative process. In addition, the techniques we used also focused on the effectiveness of activities and working out the stages of achieving the goal.

A combination of factors of the organization of the educational process and psychological and educational support ($t = -6.69$, variance = 98 at $p < 0.05$) also affected the increase in imagination. The intensity of learning in general and the process organization in the second academic semester impose the requirements for greater thoughtfulness, which will make it possible to implement ideas in the shortest possible time without losing the quality of work. As we considered imagination, after Vishnyakova, through increased information detailing (which is also manifested in the parameters of cognitive styles), we used several techniques for its development. Psychological and educational support contributed to thinking over and detailing ideas, i.e. to increasing in Imagination.

The growth in emotional sensitivity (empathy) may be due to the inclusion of a large amount of personally meaningful information in the activities and an orientation towards identifying emotional components in it. Also, an increase in values for this component is associated with students' increased need to work in a group and, accordingly, need to be more attentive to the emotional state of others ($t = -4.63$, variance = 98 at $p < 0.05$).

There are no statistically significant changes in other components of creativity. It can be assumed that this is due to the subjectively low role of these components in the activities of the students during the period of psychological and educational support. Curiosity, intuition, sense of humor and a creative attitude to the profession play an important role in creativity in general, but do not have a significant effect on the results of the students' activity. Originality is in the range of average values, thus, the students are able to produce original ideas, but an increase in their quality and quantity at this stage is not regarded as necessary.

4. Discussion

The findings showed the changes in some components of creativity in students with dominant cognitive style. Field independent students with differentiation are characterized by significant changes in creative thinking and curiosity, while those, who are field dependent and with integrity, did not reveal significant changes in these components. Our data are consistent with

the findings by Witkin, who noted that field-dependent people have weaker behavioral control, and are also carriers of less developed defense mechanisms (Kholodnaya, 2004).

We assume that in case of study load and the need to prepare for final exams such students are not able to fully analyze the information. They focus their attention on aspects, which results in the decrease in creative thinking.

Initially, the students with integrity (at the stage of the primary diagnostics) had high values for emotional sensitivity. Within psychological and educational support, they did not have statistically significant changes in this component of creativity. Students with differentiation had significant changes. It might be due to the fact that this group, within the framework of accompanying activities, worked with personally meaningful information or, through analysis, learned to turn information into personally meaningful.

We can say that students with a predominance of differentiation and integrity are different in terms of creativity. The students, who are characterized by dominant integrity, have average creative thinking results and a high level of emotional sensitivity. This group is more stable and less susceptible to influence and change. Students with dominant differentiation have similar creative thinking and emotional sensitivity, but are more susceptible to influence and are prone to changes.

We also identified the correlation between field dependence – field independence and the components of creativity. In the target group, there were changes in imagination. At the same time, there were no statistically significant differences between the parameters. In our opinion, this is due to the presence of a large number of exercises for the development of imagination, as well as factors of academic environment, which provide equal requirements and opportunities for students with both parameters of the cognitive style. The data are comparable with those of Pezdek and Lam, who note the positive correlation between field independence, creativity and academic performance (Pezdek, Lam, 2007).

Values of creative thinking in field dependents remained at the level revealed in the course of the primary diagnostics. The changes in the group of field-independents can be caused by a decrease in the degree of individual involvement in work and relying only on external clues and demands, which has reduced the conscious creative activity.

Statistically significant changes in intuition (component of creativity, measured by Vishnyakova's test) were not found, but polarization of value was observed. Intuition among field-dependents was of medium and high values. There were decreasing values for this indicator in field-independents. Since FD students are more focused on perception and externally specified conditions, they can operate with a large amount of information about what is happening and build more objective predictions (consciously or intuitively). Field-independents are more focused on their own judgments of information and activities and have fewer opportunities to build an intuitive forecast and trust it. We agree with Henry, Roediger III, Pyc, who note that learning contributes to the development of field-independent thinking and perception styles (Henry, Roediger III, Pyc, 2012).

Similar trends were observed in curiosity. Field-dependents tended to rely on external clues of perception and were less focused on internal positions.The exercises and methods we conducted were aimed at attracting personally meaningful information, which could reduce the level of curiosity among field dependents. In our opinion, the inclusion of this kind of information increased "curiosity" in the FI students.

Field-dependent students have higher emotional sensitivity (empathy) due to their involvement in the external conditions of activity (organization of work, the emotional state of others, etc.). Field independent students are more focused on themselves and their own judgments of the situation, which reduces their emotional involvement. These data are comparable to Dunlosky et al., who noted that the ability to quickly process the information when taking notes can be considered one of the factors of academic performance at a university, which is associated with a high level of field independence (Dunlosky et al., 2013).

There are also differences in creativity among students with the dominant field dependence or field independence. Field-dependents are characterized by average imagination, creative thinking and curiosity, high intuition and emotional sensitivity. The values change if they imply an orientation towards external clues (increase in values) or a high level of personal involvement (decrease in values).

Field-independents had average values in imagination, creative thinking, intuition and emotional sensitivity, well-developed curiosity. The tendencies of changes in this category were opposite: an increase in values was observed in a situation of personal involvement, and a decrease was observed when it was necessary to focus on external clues.

5. Conclusion

After the end of the implementation of the support program the participants had changes in the values of some components of creativity and their relationship with cognitive styles. The changes can be traced by analyzing the results at each stage. At the stage of the primary diagnostics, the students were characterized by an average level in all components of creativity. This reflects the ability of the students to produce new ideas, but with a number of limitations.

The main limitation is the unconsciousness of the creative process. The students have a range of interests, which, as a rule, includes professional activity. Information that goes beyond their interests is partially perceived or ignored. In this case, originality is closely related to the creative attitude to the profession, which manifests itself in the presence of internal limitations associated with the unwillingness to actively and creatively express oneself in the profession. Values on intuition and emotional sensitivity testify to the great emotional potential of the students, but the inability to express their emotions, the predominance of the logical component in assessing the situation and expressing their attitude to it. On the “sense of humor” scale, points were obtained within the limits of average values, which is due to the tendency to perceive information holistically. In general, in the perception and operation of information, participants were characterized by an orientation towards the integrity of the picture and reliance on externally specified conditions. For most students, it was difficult to comprehensively analyze the information and evaluate it in accordance with specific conditions and their own criteria.

The results obtained in the course of the second measurement indicated the presence of changes in individual components of creativity, as well as an increase in integration between the parameters of the cognitive style and these components. The participants of the experimental group had higher values for creative thinking indicator, which resulted in generating new ideas and creating new products. Imagination values went up, i.e. the students began to detail events more often (using real or fictional facts). The emotional repertoire and the frequency of demonstrating one's emotional state have increased.

The parameters of the cognitive-style organization were unchanged, but a correlation was found between the predominance of one of the poles of the parameter and the intensity of changes. Thus, participants with predominant differentiation were characterized by greater flexibility and readiness to change than people from the poles of integrity. The relationship between FD and FI and the components under consideration varied depending on the prevailing pole. In FD students there is an increase in values for those components that imply an orientation towards external clues, and a decrease in components that require personal involvement. FI students were characterized by an increase in values with personal involvement and a decrease in a situation of orientation towards external clues or demands.

References

Allinson, Hayes, 1996 – *Allinson, C., Hayes, J.* (1996). The Cognitive Style Index: A Measure of Intuition-Analysis for Organizational Research. *Journal of management studies.* 33(1): 119-135.

Armstrong et al., 2012 – *Armstrong, S., Rayner, S., Peterson, E.* (2012). Understanding and defining cognitive style and learning style: *A Delphi study in the context of educational psychology Educational Studies.* 4: 449-455.

Barysheva, 2012 – *Barysheva, T.A.* (2012). Psychological structure of creativity (experience of empirical research). *Izvestiya Rossiiskogo gos. ped. un-ta im. A.I. Gertsena.* 145: 54-65. [in Russian]

Biggs, 2011 – *Biggs, J.* (2011). Enhancing learning: A matter of style or approach? Perspectives on thinking, learning, and cognitive styles. New York, Routledge. Pp. 73-102.

Breslav, 2010 – *Breslav, G.M.* (2010). Osnovy psikhologicheskogo issledovaniya [Fundamentals of psychological research]. M.: Smysl; Izdatel'skii tsentr «Akademiya», 492 p. [in Russian]

Dietrich, 2004 – *Dietrich, A.* (2004). The cognitive neuroscience of creativity. *Psychonomic Bulletin & Review*. 11(6): 1011-1026.

Dubnikova, Volkova, 2017 – *Dubnikova, T.A., Volkova, E.V.* (2017). Metodika diagnostiki kognitivnogo stilya individual'nosti [Methods of diagnostics of the cognitive style of an individual]. *V sbornike: Lichnost', intellekt, metakognitsii: issledovatel'skie podkhody i obrazovatel'nye praktiki.* Pp. 645-652. [in Russian]

Dunlosky et al., 2013 – *Dunlosky, J., Rawson, K.A., Marsh, E.J., Nathan, M.J., Willingham, D.T.* (2013). Improving Students' Learning With Effective Learning Techniques: Promising Directions From Cognitive and Educational Psychology *Psychological Science in the Public Interest*. 14(1): 4-58.

Ehrman, Leaver, 2003 – *Ehrman, M.E., Leaver, B.L.* (2003). Cognitive styles in the service of language learning. *System*. 31: 393-415.

Ilyin, 2012 – *Ilyin, E.P.* (2012). Psikhologiya tvorchestva, kreativnosti i odarennosti [Psychology of creativity, creation and talent]. Sankt-Petersburg, 448 p. [in Russian]

Kholodnaya, 2004 – *Kholodnaya, M.A.* (2004). Kognitivnye stili. O prirode individual'nogo uma [Cognitive Styles. On the nature of the individual mind. Sankt-Petersburg, 384 p. [in Russian]

Krasnoryadtseva, 2007 – *Krasnoryadtseva, O.M.* (2007). Psikhologo-obrazovatel'noe soprovozhdenie podgotovki spetsialista [Psychological and educational support for a specialist training]. *Vestnik Tomskogo gos. un-ta.* 305: 165-168. [in Russian]

Lyatetskaya, 2014 – *Lyatetskaya, I.N.* (2014). Kognitivnye stili studentov kak komponent mental'nosti [Students' cognitive style as a component of mentality]. *XI Mezhdunarodnaya nauchno-metodicheskaya konferentsiya: sb. nauchnykh statei.* Smolensk. Pp. 139-143. [in Russian]

Mamedova et al., 2016 – *Mamedova, L.V., Gudkov, Yu.E., Sergievich, A.A., Khoroshikh, P.P.* (2016). Kognitivnye stili: sovremennye aspekty issledovanii [Cognitive styles: modern aspects of research]. *Vestnik Leningradskogo gosudarstvennogo universiteta im. A.S. Pushkina.* 2: 134-142. [in Russian]

Moroshkina, Gershkovich, 2016 – *Moroshkina, N.V., Gershkovich, V.A.* (2016). Tipologiya empiricheskikh issledovanii v psikhologii [Typology of empirical research in psychology]. *Vestnik SPbGU. Seriya 16: Psikhologiya. Pedagogika*. 1: 80-99. [in Russian]

Morozova, Goldschmidt, 2009 – *Morozova, I.S., Goldschmidt, E.S.* (2009). Tipologiya empiricheskikh issledovanii v psikhologii [Typology of empirical research in psychology]. Kemerovo. 180 p. [in Russian]

Paliy, 2013 – *Paliy, A.A.* (2013). Longityudnoe issledovanie vzaimosvyazi kognitivnykh stilei, intellekta i kreativnosti v protsesse stanovleniya individual'nosti v ontegeneze [Longitudinal study of the relationship of cognitive styles, intelligence and creativity in the process of becoming an individual in ontogenesis]. *Novoe slovo v nauke i praktike.* 8: 59-71. [in Russian]

Pezdek, Lam, 2007 – *Pezdek, K., Lam, S.* (2007). What research paradigms have cognitive psychologists used to study "False memory," and what are the implications of these choices? *Consciousness and Cognition*, 16: 2-17.

Roediger III, Pyc, 2002 – *Roediger, III H.L., Pyc, M.A.* (2002). Inexpensive techniques to improve education: Applying cognitive psychology to enhance educational practice. *Journal of Applied Research in Memory and Cognition*. 1: 242-248.

Shkuratova, 1994 – *Shkuratova, I.P.* (1994). Kognitivnyi stil' i obshchenie [Cognitive style and communication]. Rostov-na-Donu, 156 p. [in Russian]

Shkuratova, 1998 – *Shkuratova, I.P.* (1998). Issledovanie stilya v psikhologii: oppozitsiya ili konsolidatsiya [Research of style in psychology: opposition or consolidation] Stil' cheloveka: psikhologicheskii analiz. Moscow. Pp. 13-33. [in Russian]

Sternberg, 2011 – *Sternberg, R.J.* (2011). Epilogue: Another mysterious affair at styles. Perspectives on thinking, learning, and cognitive styles. New York, Routledge. Pp. 249-252.

Vishnyakova, 1996 – *Vishnyakova, N.F. (1996)* Psikhologicheskie osnovy razvitiya kreativnosti v professional'noi akmeologii [Psychological foundations of the development of creativity in professional acmeology]: avtoref. dis. ... d-ra psikhol. nauk. M. 40 p. [in Russian]

Volkova, Gusev, 2016 – *Volkova, N.N., Gusev, A.N.* (2016). Kognitivnye stili: diskussionnye voprosy i problemy izucheniya [Cognitive styles: discussion questions and problems of study]. *Natsional'nyi psikhologicheskii zhurnal.* 2(22): 28-37. DOI: 10.11621/npj.2016.0203 [in Russian]