Revista Românească pentru Educație Multidimensională
ISSN: 2066-7329 | e-ISSN: 2067-9270
Covered in: Web of Science (WOS); EBSCO; ERIH+; Google Scholar; Index Copernicus; Ideas RePeC; Econpapers; Socionet; CEEOL; Ulrich ProQuest; Cabell, Journalseek; Scipio; Philpapers; SHERPA/RoMEO repositories; KVK; WorldCat; CrossRef; CrossCheck

2022, Volume 14, Issue 1, pages: 246-262 | https://doi.org/10.18662/rrem/14.1/517

Developing Intending Teachers' Creativity in the Process of Their Professional Training in the Context of Educational Transformations

Vira KUROK[1],
Nataliia TKACHENKO[2],
Stanislav BURCHAK[3],
Roman KUROK[4],
Liana BURCHAK[5]

[1] Doctor of Pedagogical Sciences, Professor, Corresponding Member of NAPS of Ukraine, the Head of Technological and Professional Education Chair, Oleksandr Dovzhenko Hlukhiv National Pedagogical University, Hlukhiv, Ukraine, virakurok@gmail.com
[2] Doctor of Pedagogical Sciences, Associate Professor, the Vice-rector for Scientific Work and International Affairs, Oleksandr Dovzhenko Hlukhiv National Pedagogical University, Hlukhiv, Ukraine, tknatik2014@gmail.com
[3] Doctor of Pedagogical Sciences, Associate Professor of the Department of Physical and Mathematical Education and Informatics, Oleksandr Dovzhenko Hlukhiv National Pedagogical University, Hlukhiv, Ukraine, stas5578086@gmail.com
[4] Candidate of Juridical Sciences, Associate Professor, Junior researcher of the laboratory of scientific and methodical support of training in colleges and technical schools of the Institute of Vocational Education, National Academy of Pedagogical Sciences of Ukraine, Kyiv, Ukraine, romaku2010@gmail.com
[5] Candidate of Pedagogical Sciences, Associate Professor of the Departament of Biology and agriculture groundings, Oleksandr Dovzhenko Hlukhiv National Pedagogical University, Hlukhiv, Ukraine, liana1335502@gmail.com

Abstract: The article considers the problem of developing creativity of intending teachers in pedagogical universities of Ukraine. In the context of the research the state of intending Mathematics teachers' creativity development in educational theory and practice was found out. The essence of the concept «creativity of intending teacher» was clarified. The pedagogical system of developing creativity of intending teachers in the course of their professional training in higher education institution was substantiated. In order to be experimentally checked theoretical results of the research have been implemented into educational practice of higher educational institutions of Ukraine by means of the pedagogical experiment. The results of the experimental study of the level of creativity of intending Mathematics teachers at the stating and forming stages are presented. The dynamics of the process of developing creativity of intending teachers is highlighted. Statistical analysis of the experimental data confirmed the validity and objectivity of the obtained results and proved the effectiveness of the author's pedagogical system of developing creativity of intending teachers.

Keywords: *training professionals, creativity, pedagogical system, intending teachers, experimental research.*

How to cite: Kurok, V., Tkachenko, N., Burchak, S., Kurok, R., & Burchak, L. (2022). Developing Intending Teachers' Creativity in the Process of Their Professional Training in the Context of Educational Transformations. *Revista Romaneasca pentru Educatie Multidimensionala, 14*(1), 246-262. https://doi.org/10.18662/rrem/14.1/517

1. Introduction

The leading idea of modern pedagogical education consists in forming professional teacher characterized by competence and mobility, independence and initiative, non-standard thinking and creative approach to work, individual methodical style and ability to organize the educational process taking into account the needs and characteristics of each student. Analysis of the professional profile of a modern teacher showed that the characteristics of each of its components contain to some extent such personal qualities of the teacher as possessing creative abilities, which are manifested not only in original products, but also in thinking, feelings and communication with their students.

In relation between «man and the world», the individual, and especially the personality of the teacher, appears as an independent creative force capable of seeing, understanding and transforming the surrounding reality. According to Goncharenko (1991), man has no nobler occupation to justify his existence on the Earth, to confirm the high rank of a man, to give him the depth and true pleasure from early adolescence to old age than creativity.

Such global trends observed at present in the society as distributing information freedom, humanistic values and democracy, intensifying intercultural interaction are the main features of the «creatogenic era» (Arieti, 1981; Csikszentmihalyi, 1988; Simonton, 1984). In this context, creativity is a kind of engine of social development in all the spheres of modern society, where a special role is played by education.

The task of developing the creativity of intending teachers is of special importance and that allows solving professional (pedagogical, methodical, subject, etc.) tasks, improving the educational process, as well as organizing the processes of self-development, self-realization and self-improvement of each student.

The current education system isn't able to ensure the development of students' creativity (Soh, 2018). Therefore it is necessary to improve teachers' training in the higher education institutions namely to provide several conditions, to use active and interactive forms, methods and technologies of organizing the educational process etc.

The tasks of the research were as follows:

1. To clarify the state of intending Mathematics teachers' creativity development in educational practice.

2. To ascertain the essence of the concept of «creativity of intending teacher» and to work out the pedagogical system of purposeful developing creativity of intending teachers.

3. To prove experimentally the efficiency of the author's pedagogical system of purposeful developing creativity of intending teachers during their professional training.

Thus, the following *hypothesis* was formulated: the purposeful developing creativity of intending teachers will be effective due to organizing their professional training by means of author's pedagogical system, based on using innovating information and communication technologies.

2. Literature review.

The problem of developing the creativity of intending teachers is given considerable attention in modern pedagogical discourse. Thus, in their own scientific achievements, domestic and foreign researchers determine the following: the general foundations of creativity (Antonova, 2012; Bohoyavlenskaya, 2007; Druzhinin, 2008; Guilford, 1965; Ilyin, 2011; Sysoyeva, 1998; Sternberg, 2002; Torrance, 1974 etc.), mechanisms of creative thinking (Altshuller, 1956; De Bono, 1992; Guilford, 1965; Moliako, 2006; Ponomarev, 1976; Torrance, 1974 etc.); creativity as a kind of intellectual behavior (Sternberg, 2002; Wechsler, 1955); «self-actualization» in connection with creativity (Maslow, 1999).

Meusburger et al. (2009) collected more than a hundred different definitions of the term «creativity» used in scientific works. Researchers use in their numerous works a number of related concepts: creativity, creative abilities, creative personality, creative activities, creative process, creative activity, creative act, creative technical activity, technical creativity, creative thinking, creative competence, creative education, creative experience, creative potential, etc.

Spinoza (1957) connected creativity directly with activity and considered it to be an essential characteristic of human being. Freud (1989) considered creative activity as the result of sublimation of sexual desire to another field of activity. Adler (1995) presented creativity as a result of compensation for the insufficiency complex. For Carl Jung (as cited by Yalans'ka, 2014) creativity was a manifestation of the archetypes of the collective unconscious.

The Ukrainian researcher Sysoyeva (1998) believes that the creative activity of an individual can be considered in two aspects: as the essence of the personality quality, which reflects both the attitude of the subject to

him/herself and the world and the way of his/her self-affirmation; as an activity of a certain nature, which reflects the highest degree of human activity aimed at overcoming certain contradiction in accordance with the goal. The search for the ways to overcome the contradictions between fulfilling the public demand for creatively active pedagogues and their training in the higher education system can be found in modern works (Ibragimkyzy et al., 2016; Zivitere et al., 2015). In their scientific achievements, Selkrig and Keamy (2017) note a certain disregard for the concept of creative training teachers in the framework of intending educators' professional training.

The analysis of literature sources showed that in practice various models and techniques of developing creativity of intending pedagogical workers were used: the mixed model of training (Kanchanachaya, 2012), joint training and instruction on synectics (Chuathong et al., 2011), technique of six-thinking-hats (Aulpaijidkul, 2011), situational and problem-based learning, inventive problem solving, games, portfolio, project, (Shkabarina et al., 2020), information and communication technology tools (Titova et al., 2021), students' social networks (Pulgar, 2021), the 5E model (Zhou, 2021), social modelling, reinforcement, and classroom ecology (Soh, 2017), etc.

In the scientific context, research is conducted on the development of various types of creativity, where the classification is based on the generating creative ideas: technical (Byvalkevych et al., 2020), social (Mouchiroud & Lubart, 2002), entrepreneurial (Petrakis & Kafka, 2016) and others. Creativity can also be formed and developed due to the environmental factors (De Bono, 1992; Sternberg, 2002). Despite the rich knowledge base, the phenomenon of creativity still remains insufficiently studied. This can be mainly explained by the complexity of its characteristics. The above mentioned facts led to the existence of a fairly large number of approaches that focus on various aspects of both the interpreting the concept and the process of its developing. The analysis of recent scientific literature also disclosed the lack of researches that substantiate the system of purposeful development of creativity of intending Mathematics teachers, which would provide training future specialists capable of performing professional duties in the New Ukrainian school, to implement state policy on the comprehensive development of personality. It can cause restricted using of pedagogical factors and insufficient providing appropriate conditions for developing teachers' creativity in the process of their professional training. It also can slow down this process at higher

educational institutions and prevent using innovative pedagogical technologies.

3. Methodology

Within our research, we consider the concept of «creativity of intending teacher» as an integrative intrinsic property of the personality, based on hereditary, innate inclinations of the subject to creative activity, manifested in the pedagogical activities, actions and behaviors of the intending teacher. pedagogical activity based on the system of knowledge, skills, needs, motives, methodical knowledge and necessary personal qualities (attention, memory, imagination, activity, initiative, curiosity, diligence, self-confidence, persistence, motivation and readiness for innovations, ability to generate creative ideas, analyze and synthesize statements, critical thinking, etc.) and readiness for creative self-improvement and self-development in the process of performing the professional duties.

In order to apply the conceptual ideas of the research into practice we worked out pedagogical system of purposeful developing creativity of intending teachers as a component of the system of Bachelor professional training. Its development is based on the provision that all the systems are organized due to the certain structure, order and connections. The system contains the following components: purpose, objectives, subjects of educational process, content, technologies of developing creativity, methods, forms of organizing the educational process, results. Among the pedagogical technologies the technologies of interactive, problem-based learning, as well as information and communication were singled out. The teaching aids include textbooks, professional periodicals, electronic information resources, presentations, videos, tests, etc. The forms of organization of the educational process are as follows: discussion (problem lectures, practical/seminar and laboratory classes), interactive (case situations, round tables, master classes, trainings, etc.).

In order to experimentally verify the mentioned above theoretical findings pedagogical experiment was carried out under natural conditions. The applicants for higher pedagogical education, specialty 014 Secondary education, subject specialty 014.04 Secondary education (Mathematics) were the subjects of the scientific research. The experiment was attended by 364 applicants for higher education of the control groups and 362 students of the experimental groups of Oleksandr Dovzhenko Hlukhiv National Pedagogical University, Sumy State Pedagogical University named after A. S. Makarenko, Skovoroda Kharkiv National Pedagogical University, V. H. Korolenko Poltava National Pedagogical University.

According to the objectives of the study, the following methods were used: the *theoretical ones:* theoretical prediction, induction, deduction, concretization, synthesis in order to develop the levels, criteria and indices of intending teachers' creativity; the *empirical ones*: survey (testing, questionnaires, interviews) to determine the levels of creativity of intending teachers, pedagogical observation to additionally verify the data; pedagogical experiment aimed at studying the process of developing the creativity of students, specifications of the technique of its purposeful developing and checking the efficiency of the developed system; the *statistical ones*: Pearson's criterion for processing, interpreting and providing the experimental results.

Evaluation of the results of the experimental work in the experimental and control groups was conducted on the basis of determining the levels of development of intending Mathematics teachers' creativity, which was implemented into practice by means of certain diagnostic tools (the system of authors' test tasks, as well as by writing special control tests).

The qualitative analysis of the answers of higher education students to test questions allowed evaluating each component (motivational-volitional, cognitive, productive and activity, reflexive) and each level of the development (initial, medium, sufficient, high) of the creativity of intending Mathematics teachers in the process of their professional training.

For determining the levels of motivational-volitional component of creativity development, the motivational-value evaluation criterion was used, the indices of which determine:

1) the presence of the natural qualities of the personality in terms of creative activity;
2) awareness of the importance of developing their own creativity;
3) the desire for the creative professional activity.

The information-knowledge criterion was used to assess the levels of the development of the cognitive component of creativity. Its indices are as follows:

1) the system of knowledge in the psychological, pedagogical and professional disciplines;
2) knowledge on forms, methods, means of the creative development;
3) the availability of methodological knowledge.

The operational-technological criterion allows assessing the levels of the development of the productive and activity component of the creativity of intending teachers. Its indices are as follows:

1) the ability to develop teacher's and student's creativity;

2) the ability to create unusual ways of solving problems;
3) the ability to analyze, synthesize statements, use information and communications technologies in the educational process.

To assess the levels of the development of the reflexive component of creativity the reflexive-corrective criterion can be used, the indices of which are as follows:

1) the ability to self-analysis of their own activities;
2) the ability to make adjustments in the development of creativity;
3) the ability to self-educational, productive activities in the development of creativity, enrichment of mental experience.

4. Results

One of the main tasks of the study was conducting the *stating stage of the experiment*. The data obtained at the stage of the study are presented in Table 1.

Table 1. Distribution of respondents by levels of development of creativity components of intending teachers (stating stage)

Levels	Number of respondents	%	Total number of respondents
Motivational-volitional component			
initial	153	21,1	726
medium	274	37,7	
sufficient	162	22,4	
high	137	18,8	
Cognitive component			
initial	213	29,4	726
medium	290	39,9	
sufficient	118	16,3	
high	105	14,1	
Productive and activity component			
initial	245	33,7	726
medium	233	32,1	
sufficient	155	21,4	
high	93	12,8	
Reflexive component			
initial	184	25,4	726

medium	251	34,6
sufficient	139	19,2
high	152	20,8

As it can be seen, the level of development of all the creativity components of intending teachers (motivational-volitional, cognitive, productive and activity, reflective) in the vast majority corresponds to the average level (37.7%, 39.9%, 32.1%, and 34.6%, respectively). A significant number of respondents have the initial level of development of the creativity components (21.1%, 29.4%, 33.7%, 25.4%, respectively). Approximately the same number of students have the sufficient and high levels of creativity, and this number is quite small (motivational-volitional – 22.8% and 18.8% respectively, cognitive – 16.3% and 14.1%, productive and activity – 21.4% and 12.8%, reflexive – 19.2% and 20.8%, respectively).

Thus, the results of stating research convincingly prove that the development of intending Mathematics teachers' creativity in the pedagogical institutions of higher education does not yet receive the sufficient scientific justification, and the prospects of training intending professionals for the researched activities must be associated with introducing the effective pedagogical system into the pedagogical university.

The *forming part of the experiment* (FE) on introducing the system of creative development of intending teachers took place in four stages (information and motivational, content-procedural, creative-modelling, result and correction).

The purpose of the information and motivational stage (1st year of studies) consists in: determining the readiness of higher education students to perform creative tasks, organizing and conducting creative activities while studying at the university, motivating creative activities of intending teachers, accumulating the necessary information, discussing the research problem, peculiarities of developing creativity of intending Mathematics teachers with the team, etc. The expected results are as follows: readiness of higher education students to perform professionally oriented creative tasks in the conditions of the professional training of intending teachers.

At the content-procedural stage (1st-2nd years of studies) there were the following activities: deepening the knowledge of intending Mathematics teachers on the essence of creativity in the New Ukrainian School in general and in the process of teaching Mathematics in particular; selecting the forms, methods, means of teaching Mathematics in secondary education; developing intending teachers' own and their future students' creativity; forming the diagnostic, prognostic, projecting, managerial and other skills

necessary for developing their own and their future students' creativity. The expected result is the developed scientific and methodical support of training higher education students for developing their own and their future students' creativity.

The purpose of the creative-modelling stage (3rd-4th years of studies) of introducing the system is as follows: using the developed authors' scientific and methodical support of the process of creativity development of intending teachers in the real educational process of pedagogical institutions of higher education. The expected results at the outlined stage of creativity development were determined: the development of creativity of intending educators, as a result of the gradual, purposeful continuous educational process, including modelling the creative activity of students.

At the result and correction stage (4th year of studies) there was the final determination of the levels of creativity of intending Mathematics teachers during their professional training, which was the purpose of the stage. The success of the effective correction stage in the availability of quality tools for assessing the level of creativity can be seen, taking into account the characteristics of individual creative experience of intending teachers of Mathematics. The expected result was increasing the levels of the development of intending Mathematics teachers creativity due to the introduction of the authors' system in the real educational process at the pedagogical university.

The important stage of the study was the development of the methodical support of the educational components: «Teaching methods: Mathematics», «Elementary Mathematics: school course», «Teaching methods: selected items of Mathematics», «Teaching methods: school Mathematics course», as well as introducing the authors' educational component «Teaching methods: creative development of the teacher» to the educational process of the pedagogical university.

The above mentioned can be illustrated by table 2 and figures 1-4.

Table 2. Distribution of respondents by levels of the development of creativity components

Levels, %												
initial			**medium**			**sufficient**			**high**			
SE	**FE**		**SE**	**FE**		**SE**	**FE**		**SE**	**FE**		
	EG	CG		EG	CG		EG	CG		EG	CG	

Motivational-volitional component											
21,1	18,5	24,2	37,7	25,3	33,7	22,4	26,7	19,6	18,8	29,5	22,5
Cognitive component											
29,4	22,4	28,1	39,9	28,7	37,6	16,3	24,9	18,7	14,1	24,0	15,6
Productive and activity component											
33,7	23,2	32,1	32,1	26,8	30,6	21,4	29,2	22,3	12,8	20,8	15,0
Reflexive component											
25,4	15,1	24,3	34,6	29,7	33,5	19,2	26,3	21,7	20,8	28,9	20,5

SE – stating experiment;
FE – forming experiment;
EG – experimental group;
CG – control group.

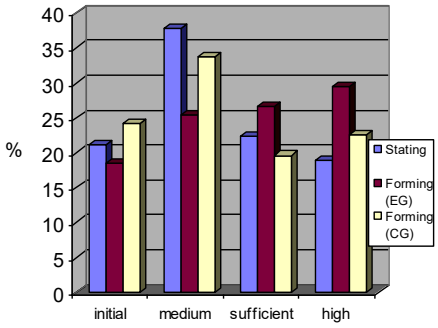


Fig.1. Dynamics of the development of the motivational-volitional component

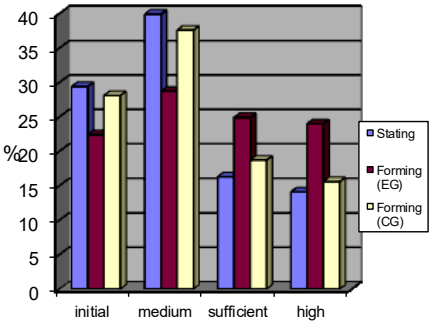


Fig.2. Dynamics of the development the cognitive component

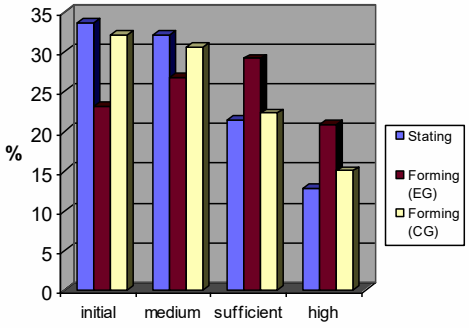


Fig. 3. Dynamics of the development of the productive and activity component

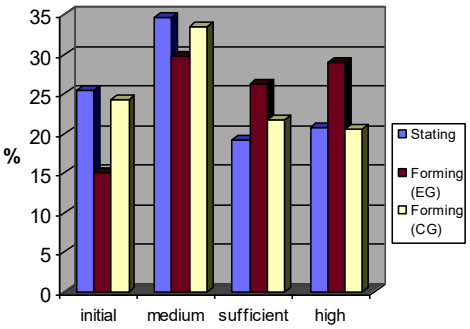


Fig. 4. Dynamics of the development of the reflexive component

It can be stated that the traditional system of the professional training of Mathematics teachers does not provide the desired results in terms of the systematic and purposeful involvement of higher education students in mastering creative professional activities.

During the forming stage of the experimental study, the effectiveness of the suggested authors' model of developing creativity of intending Mathematics teachers in the process of their professional training was checked and some of its components were specified. For this purpose, methods identical to those used in the stating part of the scientific and pedagogical research were used, as well as control tests of higher education students, differentiated by their years of study at the pedagogical university.

Thus, according to the results of testing higher education students, after the forming experiment, the most significant changes occurred at the high level of development of the motivational and volitional component of the work of intending Mathematics teachers. The number of intending teachers increased from 18.8% at the stating stage to 29.5% at the forming stage in the experimental groups and to 22.1% in the control groups. This indicates that a third of higher education students in the experimental groups and a significant number of respondents in the control groups feel the necessity for self-realization, interest in the development of their creativity, self-confidence, they are aware of the importance of creativity in their professional activities; they perceive their own creative potential as a life value, behaviour stimuli and activities, including the professional one.

The sufficient level indices allowed stating that 26.7% and 19.6% of respondents of the experimental and control groups were aware of the necessity to develop their own creativity, respectively (compared to 22.4% of the medium level of the stating experiment), feeling some uncertainty and the need to continue their personal training for developing their own and their future students' creativity. The decrease in the number of respondents in the experimental groups was recorded at the initial and medium levels. From 21.1% and 37.7%, respectively, respondents at the stating stage, their number became 18.5% and 25.3%, while in the control groups there was only a slight change, indicating the increase in the number of intending Mathematics teachers in the experimental groups that feel the need to develop their own and their future students' creativity in the process of mastering Mathematics.

The positive dynamics of the development of the cognitive component of creativity of intending Mathematics teachers can be explained by the effectiveness of the developed methodical support for developing

creativity, its structure, selecting forms, tools and techniques of developing creativity of intending Mathematics teachers in their professional training.

Thus, the high level increased from 14.1% to 24.1% (the experimental groups – EG) and to 15.6% (the control groups – CG). The sufficient levels increased in the experimental groups (from 16.3% to 24.9%) and in the control ones to 18.7%. The medium level decreased from 39.9% to 28.7% (EG) and to 37.6% (CG). The level of creativity of intending Mathematics teachers at the initial level decreased from 29.4% to 22.4% (EG) and to 28.1% (CG).

So, the results of the experimental researches showed that the substantial increase of the number of higher education students with the knowledge in the psychological, pedagogical and professional disciplines, the knowledge on developing creativity, its structure, forms, methods, tools and techniques of intending teachers' and their future students' creativity, have the ability to the pedagogical creativity, the ability to plan their own actions, to draw conclusions and general findings on the professional issues, etc.

The positive dynamics of the development of the productive and activity component of intending Mathematics teachers' creativity was provided by the system of involving higher education students in selecting and using the main means, forms and pedagogical technologies of intending teachers' and their future students' creativity: planning and designing activities in the interaction with their colleagues and students.

The high level increased from 12.8% to 20.8% (EG) and to 15.0% (CG). The sufficient level also increased from 21.4% to 29.2% (EC) and to 22.3% (CG). The medium level of the creativity development decreased from 32.1% to 28.8% (EG) and to 30.6% (CG). The level of creativity of intending Mathematics teachers at the initial level decreased from 33.7% to 23.2% (EG) and almost did not change in the control groups (32.1%).

The positive dynamics of the development of the reflexive component of creativity of intending Mathematics teachers was achieved by the ability of higher education students to conduct the qualitative and quantitative assessment of their own activities, the ability to anticipate future prospects in terms of intending teachers' and their future students' creativity.

The high level increased from 20.8% to 28.9% (EG) and remained unchanged (20.5%) in the control groups. The situation was similar with the sufficient level. The medium level of the creativity of intending educators decreased slightly from 34.6% to 29.7% (EG) and to 33.5% in the control groups. The level of creativity of intending teachers of Mathematics at the initial level decreased from 25.4% to 15.1% in the experimental groups and remained almost unchanged in the control ones (24.3%).

5. Limits and Discussions

The generalized results of the forming part of the experimental study showed that the students of the experimental groups reached the higher level of their creative development in comparison with the higher education students of the control groups who studied according to the traditional system.

The validity and objectivity of the experiment results was ensured by means of statistical processing of obtained data, which gave the ground for the conclusion that after the experiment completion there is a tendency to a significant increase in the values of statistical criterion χ^2_{emp} according to the indices of all components compared to χ^2_{crit} (motivational and volitional component - $\chi^2_{emp} = 45,02 > \chi^2_{crit} = 28,87$; cognitive component - $\chi^2_{emp} = 51,50 > \chi^2_{crit} = 31,41$; productive and activity component - $\chi^2_{emp} = 60,06 > \chi^2_{crit} = 35,17$; reflexive component - $\chi^2_{emp} = 44,60 > \chi^2_{crit} = 31,41$).

The reliability of differences between experimental and control groups is 95%. Thus, based on the data analysis the hypothesis is accepted, revealing the differences in the levels of all components of intending Mathematics teachers' creativity which cannot be caused by accidental reasons.

This fact proves the effectiveness of pedagogical system of purposeful developing creativity of intending teachers at pedagogical universities.

6. Conclusions

The obtained scientific results indicate achieving the goal and fulfilling the tasks, confirm the hypothesis and gave the grounds to formulate such conclusions:

1. At present, higher education requires training professionals, including teachers, so that they can compete in the labour market. Therefore, there is a need for forming and developing such abilities of the personality that reveal their individual qualities, intellectual abilities, creativity, etc.

Finding out the state of the researched problem in educational practice gave the grounds to the conclusion that developing creativity of intending teachers in the pedagogical institutions of higher education does not yet receive sufficient scientific grounding and purposefulness. The traditional system of professional training teachers, as evidenced by our experimental studies, does not bring the desired results for the systematic

involvement of higher education students in mastering creative professional activities.

Underestimated data of the self-assessment of teachers' activities aimed at developing creativity of higher education students indicate the existence of certain problems in their training, in particular in the process of the creative development.

2. Taking into account this fact by means of scientific literature analyses the essence of the concept «creativity of intending teacher» was clarified as the integrative quality of the personality, based on hereditary, innate inclinations of the person to creative activity, actions and behavioral manifestations of the future teacher, enables the specialist's ability to qualified innovative pedagogical activity based on methodological and mathematical knowledge, skills, needs, motives, cognitive processes (attention, memory, imagination, etc.) and personal qualities (activity, initiative, curiosity, diligence, etc.), readiness for creative self-improvement and self-development while performing professional duties.

As the prospects of developing creativity of intending professionals must be associated, first of all, with professional training, the pedagogical system of purposeful developing creativity of intending teachers, based on combination of traditional and innovative methods was worked out, theoretically substantiated and applied in the higher educational establishments by engaging students in the purposeful creative activity.

To prove experimentally the effectiveness of the author's pedagogical system of purposeful developing creativity of intending teachers at pedagogical universities the experiment was carried out. Experimental data confirmed the fact that author's pedagogical system ensures the high quality of developing creativity of intending teachers and proved its efficiency.

Obtained scientific results have been already introduced into teachers professional training process at pedagogical universities in Ukraine. The research materials can be used in adult education and teacher's self-educational activity and for further improvement of theoretical and methodological bases of intending teachers' professional training.

References

Adler, A. (1995). *Praktika i teoriya individual'noj psihologii.* [Practice and theory of individual psychology]. Progress.

Altshuller, O. (1956). O psikhologii izobretatelskogo tvorchestva [On the psykhology of inventive creativity]. *Voprosy psikhologii*, *6*, 37-49.

Antonova, O. (2012). Sutnist poniattia kreatyvnosti: problemy ta poshuky [Essence of the concept of creativity]. In O. A. Dubaseniuk (Ed.), *Teoretychni i prykladni aspekty rozvytku kreatyvnoi osvity u vyshchii shkoli* [Theoretical an practical aspects of developing of creative education in the higher school]. (pp. 14-41). Vyd-vo im. I. Franka.

Arieti, S. (1981). *Creativity: The Magic Synthesis*. Basic Books.

Aulpaijidkul, N. (2011). *Effects of web-based collaborative learning with a discussion board using six thinking hats technique in fundamental arts subject on creative thinking of undergraduate students with different creative thinking levels*. Chulalongkorn University.

Bogoyavlenskaya, D. (2007). Zarubezhnyye issledovaniya psikhologii tvorchestva: Postgildofordovskiy period [Foreign research on the psychology of creativity: the Post-Guildford period] *Psikhologicheskaya nauka i obrazovaniye*, *12*(4), 94-102. https://psyjournals.ru/en/psyedu/2007/n4/Bogoyavlenskaya_Susokolova.shtml

Byvalkevych, L., Yefremova, O., & Hryshchenko, S. (2020). Developing Technical Creativity in Future Engineering Educators. *Revista Romaneasca Pentru Educatie Multidimensionala*, *12*(1), 162-175. https://doi.org/10.18662/rrem/206

Chuathong, S., Koraneekij, P., & Na- Songkla, J. (2011). Development of a virtual classroom model using collaborative learning and synectics instruction to develop pre-service teachers' creative thinking. *Journal of Rattana Bundit University*, *6*(2), 13-25. http://journal.rbac.ac.th/wp-content/uploads/2019/09/55-6_2p13-25.pdf

Csikszentmihalyi, M. (1988). Society, culture and person: A system view of creativity. In R. J. Sternberg (Ed.), *The nature of creativity* (pp. 325-329). Cambridge University Press.

De Bono, E. (1992). *Serious creativity*. Harper Business.

Druzhinin, V. (2008). *Psikhologiya obshchikh sposobnostey*. [Psychology of general ability]. Piter.

Freud, S. (1989). *Vvedenie v psihoanaliz*. [Introduction to psychoanalysis]. Nauka.

Guilford, D. (1965). *Psikhologiya myshleniya* [Psykhology of thinking]. Progress.

Goncharenko, N. V. (1991). *Genij v iskusstve i nauke*. [Genius in arts and science]. Iskusstvo.

Ibragimkyzy, S., Slambekova, T. S., Saylaubay, Y. E., & Albytova, N. (2016). Problems of Pedagogical Creativity Development. *International Journal of Environmental and Science Education*, *11*(12), 5290-5298. https://eric.ed.gov/?id=EJ1115603

Ilyin, E. (2011). *Psikhologiya tvorchestva, kreativnosti, odarennosti*. [Psychology of creativity and giftedness]. Piter.

Kanchanachaya, N. (2012). *Development of a blended learning model based on creative problem solving principles using lateral thinking to enhance creative problem solving abilities for instructional media production of pre-service teachers*. Chulalongkorn University.

Maslow, A. (1999). *Dalniye predely chelovecheskoy psikhiki*. [The far reaches of the human psyche]. Evraziya.

Meusburger, P., Funke, J., & Wunder, E. (2009). *Milieus of Creativity: An Interdisciplinary Approach to Spatiality of Creativity*. Springer.

Moliako, V. (2006). *Zdibnosti, tvorchist, obdarovanist: teoriia, metodyka, rezultaty doslidzhen*. [Healthiness, creativity, giftedness: theory, methodology, research results]. Ruta.

Mouchiroud, C., & Lubart, T. (2002). Social creativity: A cross-sectional study of 6- to 11-year-old children. *International Journal of Behavioral Development*, *26*(1), 60-69. https://doi.org/10.1177/016502540202600111

Petrakis, P. E., & Kafka K. I. (2016). Entrepreneurial Creativity and Growth. *Entrepreneurship - Practice-Oriented Perspectives*, Mario Franco, IntechOpen. https://doi.org/10.5772/65453

Ponomarev, Y. (1976). *Psikhologiya tvorchestva i pedagogika*. [Psychology of creativity and pedagogy]. Pedagogika.

Pulgar, J. (2021). Classroom creativity and students' social networks: Theoretical and practical implications. *Thinking Skills and Creativity*, *42*, 100942. https://doi.org/10.1016/j.tsc.2021.100942

Selkrig, M., & Keamy, K. (2017). Creative pedagogy: a case for teachers' creative learning being at the centre. *Teaching Education*, *28*(3), 317-332. https://doi.org/10.1080/10476210.2017.1296829

Shkabarina, M., Verbytska, K., Vitiuk, V., Shemchuk, V., & Saleychuk, E. (2020). Development of Pedagogical Creativity of Future Teachers of Primary School By Means of Innovative Education Technologies. *Revista Romaneasca Pentru Educatie Multidimensionala*, *12*(4), 137-155. https://doi.org/10.18662/rrem/12.4/338

Simonton, D. (1984). *Genius, creativity and leadership: Historiometric inquiries*. Harvard Univ. Press.

Soh, K. (2017). Fostering student creativity through teacher behaviors. *Thinking Skills and Creativity*, *23*, 58-66. https://doi.org/10.1016/j.tsc.2016.11.002

Soh, K. (2018). Creativity Fostering Teacher Behavior Index (CFTIndex): Its Design, Validation, Replications, and Further Research. In K. Soh (Ed.), *Creativity Fostering Teacher Behavior Measurement and Research. World Scientific*.

(pp. 17-36). Singapore Centre for Chinese Language. https://doi.org/10.1142/9789813234161_0002

Spinoza, B. (1957). *Izbrannye proizvedeniya.* [Selected works]. Vol. 1. Gospolitizdat.

Sternberg, R. J. (2002). Creativity as a decision: Comment. *American Psychologist*, *57*(5), 376. https://doi.org/10.1037/0003-066X.57.5.376a

Sysoyeva, S. O. (1998). *Pedahohichna tvorchist.* [Pedagogical creativity]. Karavela.

Titova O., Luzan P., Sosnytska N., Kulieshov S., Suprun O. (2021) Information and Communication Technology Tools for Enhancing Engineering Students' Creativity. In: Ivanov V., Trojanowska J., Pavlenko I., Zajac J., Peraković D. (eds) *Advances in Design, Simulation and Manufacturing IV. DSMIE 2021. Lecture Notes in Mechanical Engineering*. Springer. https://doi.org/10.1007/978-3-030-77719-7_33

Torrance, E. (1974). *Torrance Tests of creative thinking: Norms - Technical manual.* Ginn and Company.

Wechsler, D. (1955). *Manual for the Wechsler Adult Intelligence Scale.* Psychological Corporation.

Yalans'ka, S. P. (2014). *Psykholohiia tvorchosti.* [Psychology of creativity]. Korolenko Poltava National Pedagogical University.

Zhou, C. (2021). The effectiveness of 5E model to improve the scientific creativity of teachers in rural areas. *Thinking Skills and Creativity*, *41*,100900. https://doi.org/10.1016/j.tsc.2021.100900

Zivitere, M., Riashchenko, V., & Markina, I. (2015). Teacher – Pedagogical creativity and developer promoter. *Procedia-Social and Behavioral Sciences*, *174*, 4068-4073. https://doi.org/10.1016/j.sbspro.2015.01.1156