Creative Pedagogical Development of Students Based on the Implementation of Didactic Games

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Abstract: This article discusses the implementation of innovative technologies in the process of training students of a pedagogical university. The purpose of the study: to develop a set of didactic games for students - future teachers and experimentally prove the effectiveness of its implementation to enhance their creative pedagogical development. The experimental study was attended by full-time, part-time and evening students (n=286) of the Pedagogical Institute. Students of the experimental group implemented a set of special didactic games (n=14) in extracurricular activities during the school year. Didactic games were implemented by students independently on the basis of a university-wide student scientific society at the center of the council of students and student scientific initiatives. Didactic games for research and practical implementation were differentiated by target, long-term and structural features. The obtained statistical data in the study ($p < 0.05$) proved the effectiveness of introducing a variety of didactic games in extracurricular time of students without the participation of teachers, in the mode of independent control over the process of their conduct. The didactic games implemented during the school year had a significant positive impact on creative pedagogical development through raising the level of creative well-being, communication skills and pedagogical improvisation of students. The study revealed new scientific data on the processes of increasing creative extracurricular activities of students and patterns that exist in the studied pedagogical science on this issue. This is one of the key conditions for improving the quality of professional training of future teachers.

Keywords: *Creative development; didactic games; students; teacher education.*

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1. Introduction

To date, to ensure the effectiveness of the educational process, the professional activity of a teacher should include the planning and organization of educational and cognitive activities, the generalization and transfer of information, the systematization and formation of knowledge, skills (Chagovets et al., 2020; Dvoryatkina et al., 2019). The teacher should be able to rationally and timely adjust the educational process, carry out pedagogical diagnosis and control the learning process, and also analyze the educational activity and its intermediate and final results (Fedirchuk & Nitalia, 2019; Nagovitsyn et al., 2019). To increase the effectiveness of the educational process, special emphasis should be placed on the formation of teacher competencies in the field of stimulating and motivating the learner's personality in the learning process (Sushchenko et al., 2020). Each of these activities is necessary to improve the quality of education for schoolchildren and they are all synergistically interconnected (Bereczki & Karpati, 2018). However, to implement practical pedagogical activities in the new decade of the 21st century, another key activity is needed (Daly et al., 2019). Namely, creative activity, the result of which is the creation of new independently updated material and spiritual values (Maksic & Spasenovic, 2018).

2. Literature review

The analysis of special scientific and methodological literature revealed that creative activity should be based on special abilities, motives, knowledge and skills, thanks to which a product is created that is different in novelty, originality and uniqueness (Hemdan & Kazim, 2019; Oztop et al., 2018). However, the creativity of the teacher is only one form of creativity (Kampylis et al., 2009). In the broadest sense, creativity is not only characteristic of living, but also inanimate nature (Mumford & McIntosh, 2017). It is a necessary condition for the development of matter, the formation of its new forms, with the occurrence of which a change in the forms of creativity occurs (Cheung et al., 2003). In the broadest sense, creativity is an interaction leading to non-standard and creative development and formation (Beghetto, 2016).

The student's creative process is considered as an activity aimed at solving educational problems in changing circumstances (Justice & Ritzhaupt, 2015; Kampylis et al., 2009). The implementation of this solution in practice in the process of communicating with students is also of a creative nature (Beghetto, 2016; Nagovitsyn et al., 2020). The implementation of the creative pedagogical process includes the ability to

apply already established techniques and activity skills in a new situation and the ability to create new techniques and methods (Byrge & Tang, 2015).

Being a synthesis of theoretical knowledge and practical skills, creative abilities embody the technological, operational and moral aspects of his activity and act as a component of the creative process (Carson et al., 2005). The content of pedagogical creativity can be represented in the following model (Fig. 1):

Fig. 1. A content model of student pedagogical creativity

The content of pedagogical creativity presented in the model (Fig. 1) can be described in detail in the main areas. Creative well-being is the result of an upsurge in the spiritual strength of a future teacher, a combination of a number of productive mental states that provide active creative activity. The following stages can be distinguished: pedagogical inspiration as a prerequisite, condition and result of the implementation of creative activity (Maksic & Spasenovic, 2018). The last of which is characterized by satisfaction with today's activities and the prerequisite of a creative upsurge in further pedagogical activity.

The art of communication in communicative activity is the methods and skills of organic socio-psychological interaction of a senior student and a student in pedagogical and industrial practice. The content, which is the exchange of information, the educational impact through various communication tools, as well as the organization of relationships between students (Klinkov et al., 2020). Moreover, the future teacher activates this process, organizes it, manages it, predicts and ensures the sociability of pedagogical activity (Nagovitsyn et al., 2018).

Pedagogical improvisation is the ability of a future teacher to quickly and correctly assess the situations and actions of students, make decisions immediately, sometimes without preliminary logical reasoning (Kampylis et al., 2009). His readiness is based on student experience in practice, pedagogical and special knowledge, erudition and intuitive search and

organically acting in changing circumstances, sensitively reacting to all changes and adjusting his own activities in this regard (Osipov et al., 2018).

Project research search is the willingness or ability of a student, a future teacher, to develop and implement an educational or social project (Gajda et al., 2017). The implementation of this activity is focused on the active implementation of educational research, as well as on increasing sustainable cognitive interest and the establishment of a semantic and generative function of the cognitive motive (Vaganova et al., 2020).

Professional creativity is manifested in non-standard ways of solving problems, analyzing situations and making professional decisions (Davies et al., 2013). The results of professional creativity can be in the form of new ideas, patterns, laws, concepts, principles, rules, theories, models and technologies (Hernandez-Torrano & Ibrayeva, 2020). The same abilities function in different combinations and manifest themselves in various types of creativity (Pilcher, 2017). In pedagogical activity, a special structure of interacting abilities that acquire a pedagogical orientation is formed (Cheung, 2012). To increase the level of professional creativity, various technologies are used related to the professional preparation of bachelors and their further development in the development of creative potential and its self-realization (Gajda et al., 2017). One of such technologies for the development of creative abilities of students - future teachers is didactic games (Zhang et al., 2019).

Didactic games are becoming more widespread in the system of training pedagogical personnel of the highest level (Tejedor et al., 2019). They are among the active non-traditional forms, methods and teaching aids (Gribanov et al., 2018). A key reason for the emergence of didactic games is the search for opportunities for students to be included in creative activities as part of a collective form of training (Baryshnikov & Bernshteyn, 2018). It is in the implementation of these technologies that the possibility of the most effective combination of all educational practical situations with an emphasis primarily on situations of guided cognitive activity and research activity (Goldenberg & Wiley, 2019) is manifested.

Despite the relevance and development of the declared topics, a number of problems associated with the need to develop the creative potential of students - future teachers and the design of psychological and pedagogical technologies based on the example of didactic games in extracurricular activities, remain beyond the interest of researchers and developers. Thus, the aim of the study: to develop a set of didactic games for students - future teachers and experimentally prove the effectiveness of its implementation to enhance their creative development.

3. Methodology

The experimental study was attended by full-time, part-time and evening students (n=286) of the Department of Pedagogical and Psychological Education of the Moscow Social Pedagogical Institute. In turn, this focus group was divided into two groups: the experimental group (EG) and the control group (CG). The EG (n=138) included full-time students studying in pedagogical and additional professional areas of undergraduate training in two profiles (5 years of study). Students of this group during the 2018-2019 academic year implemented a set of special didactic games in extracurricular activities. Didactic games were implemented on the basis of a university student research society at the center of the Council of Students and Student Scientific Initiatives. The CG (n=148) included students of correspondence and evening departments, pedagogical, psychological, pedagogical and additional professional areas of undergraduate training in one profile (5 years of study). Students of both groups studied in the 1st year and before the experiment they had no experience of professional activity in the education system.

During the 2018-2019 academic year, students of this group did not implement a set of didactic games due to the fact that they are engaged in professional activities outside of school hours, working in the system of general and additional education, as well as in the field of social services. There, no less than the tasks that were solved during the didactic games, they were asked to independently solve during their continuous pedagogical activity or special labor activity with youth. During the academic year, students of the EG held 14 different didactic games, differing from each other in terms of purpose, time and structure. All students who took part in the experimental work actively took part in the games as leading, specialists, opponents, leaders and active participants in the implementation of the games.

To study the creative process, unconventional methods of researching creativity were implemented by penetrating directly into the field of clearly visible pedagogical phenomena: observing the creative process of graduate students - future teachers and psychological and pedagogical testing, which allows them to study their creative abilities and personality traits (Justice & Ritzhaupt, 2015; Nagovitsyn et al., 2020).

Statistical analysis: Processing the results of the study was carried out using the statistical program SPSS Statistics 20. The significance of differences in the results was determined using Chi-square (X^2) at $p < 0.05$. Mathematical and statistical processing was carried out between the

indicators of experimental and control groups for each direction proposed in the study before the experiment (September 2018) and after the experiment (July 2019).

4. Results and Discussion

To implement the process of diagnosing the formation of the main components of the creative process of a teacher, we developed appropriate levels (**Table 1**).

Table 1. Development levels student's pedagogical creativity

Level	Creative well-being	Art of communication	Educational improvisation	Project research search
High	The student knows how to manage his creative self-feeling in accordance with his creative personality in a holistic pedagogical process	The student manages his communicative activities and organizes productive creative interaction, taking into account their communicative capabilities, realizing his communicative personality	The student owns pedagogical improvisation at all stages of the creative process, using it as a means of enhancing interaction with students, sensing the manifestation of his creative personality in improvisational activity	The student is capable of developing a project of any type and type on his own, to carry out educational research, has sustained cognitive interest
Average	Not always able to control his creative self-feeling and only partially can cause it on the eve of upcoming activities	Can manage his communicative activity: plans it, but is not always able to act correctly and quickly	Manages his improvisational activities in pre-anticipated situations of creativity, however, he does not always quickly and efficiently improvise in changing conditions of activity	Able to develop a project of only a certain type and type with the help of a mentor, to carry out part of the educational research, has an unstable cognitive interest

Low	He does not own his creative well-being and is not able to manage it in his activities	It cannot be advisable to manage your communication activities as a form of pedagogical interaction	Does not own the technique of pedagogical improvisation and cannot consciously control it in the process of creativity	Not ready for independent development of the project and together with the mentor, not able to carry out research, has no cognitive interest

In the process of implementing the creative pedagogical process of a student - a future teacher, the technology of professional development is carried out through various pedagogical situations. The main educational pedagogical situations are situations of ready presenting information, situations of guided cognitive activity and situations of research activities. In organizing these situations, it is the conduct of didactic games that corresponds to the presented areas and features (Deguang, 2012). Didactic games that are introduced into the training process combine practical pedagogical situations focused on cognitive activity, critical thinking, and design and research activities of students for the directed development of their creative potential (Davies et al., 2013; Dvoryatkina et al., 2019).

Didactic games in the EG were held 1-2 times a month throughout the school year. During the experiment, these games were not repeated and were carried out each time in a new modification. Didactic games were differentiated by target, long term and structural attributes (**Fig. 2**)

Fig. 2. Classification of didactic games

The didactic games presented in **Fig. 2**, differentiated by the target, long-term and structural features, differ in their content. Search games are conducted with a predominance of search activities or with partial search

and research activities. Such games can be oriented towards finding a completely new result or achieving an innovative result that is not traditional only for trainees, but already known to mankind (Moizer et al., 2009).

Active role-playing games imitate pedagogical situations and professional pedagogical activity: their participants fulfill roles that actually exist in the pedagogical process (Nagovitsyn et al., 2017). The functional focus of such didactic games is the acquisition of experience in the implementation of educational activities (Byrge & Tang, 2015).

Control games are designed to determine the level of assimilation of knowledge by students, the formation of the necessary skills. They make it possible in an interesting form, with the active participation of each student, to evaluate the mastery of the content of education in order to obtain information on the achievement of simulated intermediate and final results and adjust the educational process if necessary (Kostikova et al., 2019). These didactic games are also important for self-assessment and adjustment of educational activities.

Didactic games can be held to identify the personal and professional capabilities of teachers, to learn the diagnostic technique that can be used in the pedagogical process, to predict possible results taking into account specific conditions of activity, etc. (Gribanov et al., 2018). These games develop the pedagogical imagination, learn to see the perspective, analyze and identify the procedural, personal, collective capabilities of both teachers and students, to find options for their development and improvement.

In terms of time, didactic games can be: long from 8 hours to a day, average from 2 to 4 hours, short from 1 to 2 hours, or within a training session and mini-game up to 1 hour. In the learning process, it is possible to use all these types of didactic games both separately and in the system (Tejedor et al., 2019). Without violating the curriculum, short and mini-games are held. They can always be organized at the request of the teacher. As for medium and long-term games, their holding requires a change in the schedule of training sessions.

According to the structural feature, the construction of a didactic game can be fragmentary, including special introductory tasks (Goldenberg & Wiley, 2019). Fragmented games combine in their content various forms of organization of educational and cognitive activities of students. Fragmented games are most often short-lived and can be included in the content of a seminar or practical lesson of any academic discipline at the university (Daly et al., 2019).

The selection of thematic didactic games is associated with the implementation of a phased solution to the tasks on special modules or topics.

With this form, the didactic game is strictly differentiated into sections that have their own individual didactic tasks for solving. The modular principle is strictly preserved during the implementation of role-playing from the initial stage to the reflective and final stages (Deguang, 2012).

In turn, adaptive didactic games are due to the implementation of an ever-changing and adapting educational process. During the didactic game, the implementation scenario, the actions of the facilitator and mentors may change, depending on the change in the course, the conditions of the game (Sushchenko et al., 2020).

To identify the impact of the implementation of didactic games in extracurricular activities on the creative pedagogical development of students, all students of the experimental group were tested, and for comparison, a control sample was monitored. In a theoretical aspect, diagnostic procedures were implemented using special tests to select the correct answer and for data compliance. In the practical direction, the method of expert assessments was used to analyze students performing special professional tasks using the case study approach. The data obtained were analyzed by comparing student performance before (September 2018) and after (July 2019) the experiment at three levels: high, medium and low. Depending on the values obtained, the participants in the study were enrolled in various tier groups for each substantial direction in the implementation of the pedagogical creative process (**Table 3**). It should be noted that before the experimental work (September 2018), in each direction, there was a static non-reliability of differences ($p < 0.05$) between the EG and CG data by level groups. The results of this preliminary comparison prove the uniform distribution of students across the samples, which allows obtaining reliable results of the intervention after the experiment. The summary results of the experiment in all areas of creative pedagogical development of students are presented in **Table 3**.

Table 3. The results of the experiment in each direction of creative pedagogical development of students

Direction	Stage	Number of participants						P
		High level		Average level		Low level		
		EG	CG	EG	CG	EG	CG	
Creative well-being	Before	15	17	74	83	39	48	> 0,05
	After	49	28	69	75	20	45	<

								0,05
Art of communication	Before	31	35	88	94	19	19	> 0,05
	After	72	42	61	76	5	30	< 0,05
Educational improvisation	Before	9	14	78	81	51	53	> 0,05
	After	42	18	69	93	27	37	< 0,05
Project research search	Before	12	15	78	86	48	47	> 0,05
	After	19	17	98	101	21	30	> 0,05

Based on the obtained comparative results after the implementation of the experiment (July 2019), statistical reliability ($p < 0.05$) between the EG and the CG in most areas of students' creative pedagogical development was revealed. The experimental work had a positive impact on the creative well-being ($p < 0.05$), the art of communication ($p < 0.05$) and pedagogical improvisation ($p < 0.05$) of students. Despite the positive results identified, the experiment did not have a significant effect ($p > 0.05$) on increasing the project research competence of students. This circumstance is probably due to the fact that the implementation of didactic games did not include a sufficient number of tasks for the implementation of scientific activity. Or, to confirm more accurate results, a further longer experimental period is needed. Nevertheless, the obtained data prove the effectiveness of introducing a set of special didactic games to increase the indicators of creative pedagogical development of students - future teachers.

The results are consistent with a number of psychological and pedagogical research papers that prove that the implementation of didactic games contributes to the effectiveness of the implementation of student training (Goldenberg & Wiley, 2019; Tejedor et al., 2019). The data from various experiments indicate that in the higher education system, teachers are limited mainly to the creation and use of one or more didactic games in the educational process (Deguang, 2012; Moizer et al., 2009). Such an application of didactic games, as shown by the results of research work by experts in the field of didactics (Fedirchuk & Nitalia, 2019), is ineffective for the training of students - future teachers (Kostikova et al., 2019). As the present study showed, only the special complex of didactic games that was developed and put into practice was reliably ($p < 0.05$) effective for enhancing

the creative pedagogical development of students. Students studying in pedagogical, psychological, pedagogical and additional professional areas statistically ($p < 0.05$) increased the level of proficiency in pedagogical improvisation at all stages of the creative process. Which, in turn, is a leading characteristic and feature of a highly qualified teacher.

The study confirms studies proving that the orientation of the educational process of preparing a future teacher for creative activity is the basis of modern education (Bereczki & Karpáti, 2018; Cheung, 2012). Experimental studies on the formation of a system of creative skills and the development of students' creative potential with the help of didactic games only fragmentary or occasionally cover the implementation of this process outside of school hours (Byrge & Tang, 2015; Pilcher, 2017). Scientific research is most often focused on the experimental confirmation of external systemically forming factors through the dominant activity of the teacher in this process (Daly et al., 2019; Sushchenko et al., 2020). In this activity, it is the teacher who presents to students the object of their activity in the form of a system of creative assignments and cases (Beghetto, 2016; Kampylis et al., 2009). However, this study implements an original approach to the implementation of internal system-forming factors in the formation of pedagogical creativity. As the results of the experiment showed, the orientation toward independent activity of students in the implementation of didactic games, as leaders and experts, allows to achieve the highest positive results in the creative development of students - future teachers.

5. Limitations

The presented scientific work was limited to a sample of students of the Pedagogical Institute who studied in pedagogical, psychological, pedagogical and additional professional areas of undergraduate studies. In this regard, the number of study participants in each experimental sample was heterogeneous in size. The sample obtained does not make it possible to cover the entire target audience, since the study was conducted at only one university. In accordance with this, the results can be determined as preliminary, and for further more detailed analysis it is necessary to conduct a comparative analysis of several higher educational institutions of the region and the federal district. A large sample of the same size will provide more diverse information on this subject.

6. Conclusion

Thus, in an experimental study, the author's vision on the systematization of the process of creative pedagogical development of students is presented. The content of pedagogical creativity presented in the model includes four synergistically interrelated areas: creative well-being, the art of communication, pedagogical improvisation and design research. In turn, each substantive direction is differentiated and justified according to three levels of development among students - future teachers. The author's classification and differentiation of teaching didactic games for the development of students' creativity by purpose, time and structural features is presented in detail.

The obtained statistical data in the study prove the need for introducing a variety of didactic games outside the classroom of students without the participation of teachers, in the mode of independent control over the process of their conduct. The didactic games implemented during the school year had a significant positive impact on creative well-being, the art of communication, and pedagogical improvisation of students.

A fundamentally new result was obtained in the work in the planning strategy for improving the professional indicators of students in the humanitarian, natural-scientific and physical-sports fields of pedagogical education. New scientific data on the processes of increasing creative extracurricular activities of students and patterns that exist in the pedagogical science under study on this issue are revealed. What ultimately, may be one of the key conditions for improving the quality indicators of professional training and the overall effectiveness of the training system for future teachers.

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