


Development of Creative Thinking of Secondary School Pupils at Physical Cultural Lessons in Ukraine: Realities and Perspectives

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Abstract

The article deals methods of development of creative thinking of pupils of the secondary school at classes of physical training have been offered. Its specific character lies in provision of stadiality characterized by the following features: each subsequent stage of development of creative thinking is a qualitatively new way of interaction with objects and subjects of pedagogical influence; the stages form both an invariant sequence and certain variational structures that are admitted; each stage is a hierarchical formation, since it integrates the methods of interaction of subjects, characteristic of the previous stages, and includes them in a more differentiated structure of the individual; passing from one stage of development to another, pupils are confronted with manifestations of problems that prompt them to seek a more perfect way of solving them. The experimental method involves three stages: basic, productive and creative. The purpose of the basic stage is the formation of the basis for development of creative thinking of adolescents at the classes of physical culture. Pedagogical activity within its limits is directed at the development of cognitive abilities that determine creative thinking (attention, memory, imagination) and formation of the base of movements and motor activities of pupils of the main school to create opportunities for realization of creative ideas by means of motor activity. The purpose of the productive stage is to improve the perfection of its main characteristics: independence, flexibility and divergent thinking. The goal of the creative phase is to improve the pupils' ability to produce new ideas through non-standard ways of solving motor tasks and combining motor skills for creation of new product activities.

Keywords: Pedagogical Strategy, Creative Thinking, Schoolchildren, Physical Education

1. Introduction

Modern tendencies in development of international community determine the importance of forming of a new type of personality – a creative personality with a high level of spirituality and culture. Such a personality acts as a potential for development of any country of the world, a guarantee of its prosperity and power. The pedagogical strategy that ensures formation of a creative personality in Ukraine is a constant expansion of educational space, the inclusion of each pupil in a variety of activities, which creates opportunities for creative self-realization. Consequently, life advances a public request for formation of a thinking and creative personality capable to think independently, to generate ideas, to take daring non-standard decisions, to argument them. However, the practice affirms that in many schools the educational process is often focused on reproductive activity of pupils. This causes inability to use the obtained knowledge in non-standard situations by school graduates; to make independent decisions; to generate and use new ideas, plans; to solve problem tasks in different spheres of life. The necessity of solving a contradiction between the demands of a society and the real state of personal growth of schoolchildren actualizes the problem of development of their creative thinking.

Development of creative thinking of schoolchildren is a sufficiently developed problem in pedagogical theory and practice [1; 2; 3; 4; 5]. Scientists interpret the development of pupils' creative thinking as an integral process that takes place at all stages of school education by means of various educational subjects [6; 7]. They affirm that one of the effective ways to meet the creative demands of schoolchildren is to practice



physical activity [8; 9; 10]. This conceptual idea determines the logic of our scientific search.

The problem of development of creative abilities of pupils at the lessons of physical culture received some working out by scientists. Thus, the possibilities of developing creative abilities of pupils of middle and senior school age in connection with motor skills and thinking [11] were studied; the conditions of development of creativity [12]; the use of principle of variability in development of creativity [13]. With the help of scholars' developments it is foreseen to develop motivational, activity, communicative, volitional, psychomotor components, as well as its cognitive component as a whole. However, the method of developing creative thinking, as the main component of pupils' cognitive and creative abilities, remains insufficiently substantiated.

2. Research Purpose

Purpose of the research: to work out and ground the methodology for developing creative thinking of secondary school pupils in the process of physical education.

3. Research Tasks

In accordance with the purpose of the research, the following research tasks were formulated:

1. To identify the attitude of teachers to the problem of development of creative abilities of schoolchildren by means of physical education and the state of development of creative abilities of pupils;
2. To develop and substantiate methodology of developing creative thinking of secondary school pupils at physical education classes.

4. Materials and Methods

A complex of methods of research has been used for solving tasks and reaching a goal of scientific research:

- *theoretical*: the analysis of problems on the basis of learning of normative documents and works in philosophy, psychology, pedagogy, methods of physical education; comparison, systematization and generalization of scientific and theoretical, and experimental data for clarification and specification of the essence of the main definitions of the research; modeling of the method of development of creative thinking of pupils in the process of physical education;

- *empirical*: pedagogical observation, questioning of teachers, testing of pupils, ranking, which made it possible to determine the real state of the problem in practice; staging and forming experiments to justify the effectiveness of the methodology of developing pupils' creative thinking in the process of physical education.

153 teachers of physical culture and 180 pupils of Ternopil, Khmelnytsky and Ivano-Frankivsk regions participated in the qualitative experiment. The formation experiment was conducted on the basis of Secondary schools No 9, 16, 24 of Ternopil during the 2018-2019 school year. 120 schoolchildren participated in it: 58 boys and 62 girls. It foresaw two diagnostic sections of determining the level of formation of creative abilities of schoolchildren: the entrance and the final. In the control classes, the pupils were trained in traditional, and in experimental classes - according to the author's methods of developing pupils' creative thinking. For confirmation of probability of the results of implementation of the experimental method, two diagnostic methods were used: "Determination of the level of formation of general creative abilities of the individual" [14], "Diagnosis of personal creative abilities" [15; 16].

5. Results

5.1. The problem of development of creative thinking of schoolchildren through the light of physical education teachers

For estimation of the state of realization of the problem of development of creative thinking at physical education classes, a questionnaire was conducted for teachers. Its results showed that 91.2% of respondents develop creative abilities of schoolchildren at physical education classes. However, ranking of the list of abilities of pupils by respondents which they improve during the process of physical education



showed that they lack proper attention in development of creative abilities from their side. Thus, according to the criterion of importance, the overwhelming majority of respondents identified the last rating place for them. The first place in rating was given to movement, on the second place – physical, on the third place – cognitive and on the fourth place – intellectual abilities. The reason for ignoring the problem of development of creative abilities of schoolchildren 77.8% of respondents named the lack of time at class. By this they confirmed secondary attitude of specialists in physical training to its solution.

Among respondents who assert that they purposefully develop creative thinking of schoolchildren, only 29.8% of them solve this problem as independent, 58.4% – as auxiliary, and 4.6% of specialists in pedagogical activity practice both variants for setting the task.

At the lack of knowledge about the possibilities of using means, methods, methodical methods of development of creative thinking, as well as the lack of tests for their assessment at physical education classes indicated 70.4% and 33% of respondents respectively. Most teachers (98%) consider physical exercises to be effective means of development of creative abilities of schoolchildren. In their opinion during the process of physical education the advantage should be given to: mobile games – 91.7%; relay races – 63.7%; musical-rhythmic complexes – 47,3%; sports games – 39.7%.

According to the results of the questionnaire the main factors determining the effectiveness of development of creative abilities of pupils have been revealed. The majority of respondents – 62.8% consider such attitude of pupils to classes. Almost equally the opinions of teachers in this issue have divided between the content of resources – 36.7% and the pedagogical conditions of conducting a physical training class – 32%.

Consequently, teachers of physical training realize wide possibilities of physical exercises in solving problems of development of creative abilities; however they do not use them fully in practical activity.

5.2. State of development of schoolchildren's creative ability

For confirmation of our conclusion pupils were questioned by the methods of M.Yantsur and E.Tunik (Table 1).

Table 1. Levels of development of creative abilities of schoolchildren according to the results of the use of methodology of M. Yantsura and E.Tunik

Methodology of M. Yantsura			Methodology E.Tunik			
Levels of development						
Low	Medium	High	Very low	Low	Medium	High
Together (%)						
6,4	83,7	9,7	0	16,1	80,7	3,2
boys(%)						
0	84,2	15,8	0	10,2	84,2	5,6
girls (%)						
16,7	83,3	0	0	25	75	0

The data obtained according to the method of M. Yantsur showed that 83.7% of pupils were characterized by an average level of creativity, 9.7% – a high and 6.4% – a low level of perfection. Girls have

somewhat better results of developing creative abilities than boys. Thus, 16.7% of young men showed a low and 83.3% showed an average level of development of creative abilities, against 84.2% of girls with an average and 15.8% with a high level of excellence in creative abilities.

Assessing the state of development of pupils' creative abilities according to the methodology of E. Tunik showed that 16.1% of the surveyed pupils were characterized by low, 80.7% – average and only 3.2% of pupils – by high levels. The boys showed lower level of development of creative abilities than girls: 75% of boys were characterized by average, and 25% – by low levels of development of personal creative abilities against 84.2% and 10.5% with the corresponding characteristics of girls. 5.6% of girls have a high level of development of creative abilities.

5.3. Fundamental principles of experimental methods of the development of creative thinking of secondary school students in the process of physical education

The analysis of the results of the observation experiment testifies that insufficient level of development of creative abilities of pupils is caused by: traditional approaches to conducting physical training classes; insufficient development of educational and methodological support for implementation of intellectual potential of physical training. This induced us to develop an experimental methodology for development of creative thinking, a methodology for developing creative thinking of secondary school pupils at physical training lessons. Its specifics lies in provision of stadiality of the corresponding process which is characterized by the following peculiarities: each subsequent stage of development of creative thinking is a qualitatively new way of interaction with objects and subjects of pedagogical influence; the stages form both an invariant sequence and certain variational structures are admitted; each stage is a hierarchical formation, since it integrates the methods of interaction of subjects, characteristic for the previous stages, and includes them in a more differentiated structure of an individual; moving from one stage of development to another, pupils come across manifestations of problems which induce them to seek a more perfect way of solving them. The experimental methodology foresees three stages: basic, productive and creative.

5.3.1. Characterization of the basic stage of the development of creative thinking of pupils

The purpose of the basic stage is formation of the basis for development of creative thinking of adolescents at lessons of physical training. Pedagogical activity within its limits is directed at development of cognitive abilities which determine creative thinking (attention, memory, imagination) and formation of the base of movements and motor activities of pupils of the main school to create opportunities for realization of creative ideas by means of motor activity.

At this stage, development of creative thinking of schoolchildren was carried out by means of track and field athletics. For development of attention of pupils at physical training classes running from a start, exercises for coordination of movements, line exercises and corresponding mobile games were used. We widely used tasks that foresaw a change in motor activities, ways of performing them on visual or auditory signals. For example, when running a race with an acceleration of 15-20 m, pupils started to the right or to the left of a teacher. The direction of the run was indicated by the teacher by means of lifting forward of the right or left hand. For development of attention we offered relay races with similar conditions of carrying out various tasks. For example, standing in front of a woodwork a teacher with the help of a whistle (or waving with a flag) made a stipulated signal, according to which pupils ran a certain number of times around the woodwork from the right or left. In a relay, which involves a jump over a pommel horse – to jump over it with legs separately, if the flag was raised or with legs bent if there was a signal with a whistle.

During physical training classes we livened functioning of verbal and logical, figurative, emotional and motor varieties of memory. Thus, visual memory was activated during perception of new motor actions demonstrated by the teacher. Verbal and logical memory during perception of teacher's explanations, self-control and mutual control while performing physical exercises. Movement memory – during the process of repeated reproduction or differentiation (increase, reduction) of spatial, temporal, dynamic, rhythmic



characteristics of motor activity. For development of memory we also used mobile games: "A fly-repeater", "Correct sequence", "Remember and do", "A detective" and others.

For development of imagination of schoolchildren techniques of exercising in imagination were used. Ideomotor exercises were used before the beginning of each new exercise, when a pupil imagined the sequence of movements and spatial, temporal and dynamic parameters of motor action. Exercises in imitation of movements are one more techniques of development of imagination. Its application foresaw imitation of sports techniques in simplified conditions. For example, performing a jerk using a gym stick instead of a horizontal bar for pulling-up or throwing without a device; creating an image of a boxer on a ring, a swimmer on land, a runner in the water, a skier on the sand. We also widely used the games and relays as ("Imaginary", "Crocodile", "Finish up the picture", "Association", "Build a figure", "Motorized puzzles", "By cells"). To increase motor luggage new exercises were systematically offered; changed the initial position of physical exercises, conditions for their implementation; partially changed the ways of conducting exercises, and every three weeks replaced the complex of general developmental exercises.

5.3.2. *Characterization of the productive stage of the development of creative thinking of pupils*

The purpose of the productive stage of the experimental method of developing creative thinking was to increase the perfection of its main characteristics. Its realization was achieved by solving the following tasks: to promote the development of independent thinking of schoolchildren by means of physical education; to develop flexibility of thinking of pupils of the main school in the process of physical education; contribute to the development of divergent thinking.

To influence the development of the main characteristics of the creative thinking of schoolchildren used basketball and mobile games.

The necessary prerequisite for the development of creative abilities of pupils in the process of physical education was the manifestation of their independence, since the creative activity of a human involves independent creation of new, original products. Independence of thinking is characterized by the ability of a man to set new tasks and solve them without resorting to other people's help. The autonomy of thinking is based on the consideration of the knowledge and experience of other people, but the person who inherits this quality, creatively approaches the knowledge of reality, finds new ways and means of solving cognitive and other problems.

Independence of thinking was developed through self-assessment by pupils and mutual evaluation of the correctness of the implementation of technical and tactical elements, the selection of individual exercises and their complexes on the instructions of the teacher, exercises for their own calculation taking into account individual characteristics (height, body weight, physical fitness). We also practiced the lessons with strengthening of the instructional function while reducing supervising function of the teacher. We widely used group method of organization and method of training, which create conditions for independent activity of pupils. During a two-way basketball game, pupils evaluated the game situation, predicted the possible actions of an opponent and players of his team and made an independent decision on their own motor activity. Involvement in the judging of games required pupils not only to know the rules, but also to respond to the game situation and timely and appropriate actions in accordance with the rules of the sports game. Any unpardonable teacher initiative and pupil's autonomy was encouraged.

Flexibility of thinking manifests itself in the ability of a person to quickly change their actions when changing the situation of activity, to expand the possibilities of functional use of a particular subject. It is an antithesis of rigid thinking, which often creates internal barriers to the generation of new ideas. For the development of flexibility of thinking we changed the rules known to pupils for sports and mobile games. Also, according to the teacher's instruction, pupils were offered the possibility of using standard equipment to solve problems that did not involve their use: the crossbar for tightening in the position of lying – for bending and extending the arms in the emphasis; medical balances – for balancing and other things. Pupils also suggested to use other subjects for the process of physical education. For example, children's sound toys – to control the amplitude of bending hands in the test case. The following mobile games were used: "The



hidden qualities of a subject", "Cross-nuts", "Various properties of a subject", "Color objects", "Confusion", "Exclusion of superfluous" and others.

5.3.3. *Characterization of the creative stage of the development of creative thinking of pupils*

The creative process involves not only the generation of ideas, but also the need to solve tasks that have many original and correct decisions, by choosing the optimal one. Therefore, divergent thinking is the basis of human creativity. For the development of divergent thinking, the method of "brainstorming" was used. Pupils reported a problem that needed a solution. The pupils expressed their own thoughts, and the teacher encouraged the introduction of new ideas and maintained the original. After analyzing all the proposals, the pupils took the best decision, taking into account the specific situation. Then in practice, the effectiveness of various methods for solving motor tasks was checked. For example, solved the following problem situations: "Which security rules would you apply during a particular game?", "What rules of the basketball game would you add, and which ones were excluded?", "Which tactics to choose to win the game? How to quickly overcome the barrier of obstacles? ", " What exercise is better to do for the development of individual muscles? ", "How to quickly overcome the obstacle? ", " What exercise to choose for improving the specific motor activity, "and others. The following mobile games were used: "Islands", which involves the nomination and implementation of ideas about the collective way of acting in a non-standard situation; "Throw the ball", which requires pupils to demonstrate creativity and non-standard solution to the task; "Overcoming space", which involves choosing the mode of action in a non-standard situation; "Arka", which helps to develop the skills of generating ideas in the team, uniting its participants and shows that it is not necessary to immediately abandon the task, if the method of execution is not determined immediately.

The purpose of the creative stage of the experimental method was to improve the pupils' ability to produce new ideas. For its solving we used a solution of the following tasks: formation of skills for non-standard solution of motor tasks; formation of skills to combine motor skills for creation of new product activities.

At this stage, pupils performed individual creative tasks: they invented new exercises, rules for moving games, complexes of general development exercises, acrobatic combinations followed by their use during physical education lessons. We practiced inventions of new kinds of sports by pupils through the combination of already known kinds of sports. For example, schoolchildren were proposed to change the rules of the game of basketball using any gymnastic elements. Pupils put forward the idea of moving the court with dance steps only. At the suggestion of combining basketball with table tennis, pupils offered to push a tennis ball tennis with tennis rackets between team members for the longest possible time keeping it while moving within the basketball court.

5.3.4. *Pedagogical conditions of development of creative thinking of pupils*

The analysis of literary sources [17; 18; 19], teaching practices and own long-term experience has allowed us to identify the pedagogical conditions that ensure an effective implementation of the methodology for development of creative thinking of pupils in the process of physical education: the creation of a positive emotional atmosphere; creative and motor activity of schoolchildren as an example of a model of activity of a teacher-mentor.

The main ways of creating the first condition – a positive emotional atmosphere, were: organization of creative activity on optimistic principles, the teacher's faith in the child's ability; raising respect for the feelings and emotions of another person; providing emotional detection for each child. In addition, musical accompaniment, elements of novelty, game and competitive techniques were widely used.

An important role in development of creative abilities of schoolchildren in the process of physical education was played by creative and motor activity of pupils on the example of a teacher-tutor. Only a creative teacher endowed with vivid creativity can give impetus to development of creative abilities of pupils, to prepare them for creative activity. In the process of development of creative abilities, the teacher



showed artistry; created an atmosphere in the classroom that envisaged approval, support for the student's search activity, initiative, originality and independence in solving creative problems; contributed and stimulated the desire of children to express themselves in creative tasks. This happened against the background of the manifestation of positive feelings by a teacher, which is an integral part of the overall culture of a teacher's personality.

5.4. Efficiency of experimental methods of the development of creative thinking of secondary school students in the process of physical education

After conducting of the formal experiment, it was revealed (according to M. Yantsur's methodology) that there were no pupils with a low level of development of creative abilities among the pupils of both the Control group (CG) and the Experimental group (EG). The number of teenagers with an average level of development of creative abilities in the EG has not changed, and in the CG increased by 6.2%. The percentage of pupils with a high level of development of creative abilities in the EG has increased by 26.6%, but in the CG did not change, which indicates the effectiveness of the experimental method (Table 2).

Table 2. Levels of development of creative abilities of schoolchildren before and after experimental training

Group	By methodology of M. Yantsura			By methodology of E.Tunik			
	Levels of development						
	Low	Medium	High	Very low	Low	Medium	High
Control group before an experiment	6,2	81,2	12,5	0	18,7	75,1	6,2
Control group after an experiment	0	87,5	12,5	0	18,7	81,3	0
% of changes	- 6,2	6,2	0	0	0	6,2	- 6,2
Experimental group before an experiment	6,7	86,6	6,7	0	13,3	86,7	0
Experimental group after an experiment	0	66,7	33,3	0	6,7	66,7	26,6
% of changes	- 6,7	0	26,6	0	- 6,6	- 20	26,6

It has been determined that after the introduction of experimental techniques, the proportion of girls with low level of development of creative abilities in CG and EG has not changed, and among young men decreased by 6.2% and 6.7% respectively. The number of girls with an average level of development in the CG remained constant, and the boys – increased by 12.5%. In EG the number of boys and girls with an average level of development has decreased by 13.3%. Girls with a high level of development of creative abilities in CG have become less by 6.2%, and the rate of boys has not changed. In EG, the number of boys with a high level of development of creative abilities has increased by 13.3%, and girls by 20%.

The results of testing (according to E. Tunika's method) have showed that the number of pupils with low a level of development of creative abilities in CG did not change, and in EG – decreased by 6.6%; with an

average level – in the CG increased by 6.2%, and in the EG – decreased by 20%; however, with a high level in the EG increased by 26.6%, whereas in the KG – decreased by 6.2%, which indicates the effectiveness of the experimental methods.

After the introduction of the experimental method the specific weight of boys and girls of the CG and boys with a low level of development of creative abilities has not changed, while girls in the EG decreased by 6.7%. The number of boys in KG with an average level of development of creative abilities has not changed, and girls – grew by 6,2%. In the EG this indicator among boys decreased by 6.7%, and for girls - by 13.3%, with an increase in the number of both boys and girls by 6.7% and 20% with a high level of development of creative abilities. Among the boys of KG with the same characteristics of creative abilities, changes did not occur, and among girls - decreased by 6.2%.

6. Discussion

The conducted studies confirm the position of scholars that school age is favorable for development of creative abilities. Their initial average level of development in the majority of surveyed pupils shows that, despite the prevalence of reproductive education in school education, creative abilities develop as a result of natural formation of cognitive functions, activities of adolescents outside the school, and pedagogical influence at school.

Practically identical results of two diagnostic methods of assessing creative abilities of schoolchildren showed their validity. Higher outgoing position of girls over boys in development of creative abilities and a more significant increase in results after the implementation of experimental techniques for development of creative thinking is evidenced by the advanced pace of development of their cognitive abilities.

Development of creative thinking by means of physical education with subsequent improvement of the results of creative abilities of schoolchildren in the EG confirms the position of the scholars about its leading role as a structural component of creative abilities.

The increase of index of perfection of creative abilities after the introduction of the experimental method shows significant potential possibilities of the means of physical education in the formation of a creative person, which is probably due to positive attitude of the vast majority of schoolchildren to lessons of physical culture and, accordingly, the influence of an emotional factor and also vividly expressed activity character of development of abilities, which combines in itself motor and cognitive activity.

7. Conclusions

The introduction of a pedagogical strategy that ensures development of creative abilities of schoolchildren (expansion of the educational space, inclusion of each pupil in a variety of activities, in particular, physical exercises, which creates opportunities for creative self-realization), helps to overcome contradictions between the requirements of society and the real state of personal growth of schoolchildren and the significance of implementation of the developmental potential of physical education classes and the lack of educational and methodological support for this process.

The results of the conducted confirmatory experiment showed that specialists in Ukraine are aware of the role of physical education in solving problems of development of creative abilities of schoolchildren. However, teachers do not use their knowledge to the full extent in practice.

The method of development of creative thinking of pupils of the secondary school at the lessons of physical training has been offered. Its specifics lies in provision of phasic corresponding process which is characterized by the following features: each subsequent stage of development of creative thinking is a qualitatively new way of interaction with objects and subjects of pedagogical influence; the stages form both an invariant sequence and certain variational structures are admitted; each stage is a hierarchical formation, since it integrates the methods of interaction of subjects, characteristic of the previous stages, and includes them in a more differentiated structure of an individual; from one stage of development to another, pupils are confronted with manifestations of problems that prompt them to seek a more perfect way of solving them. The experimental method involves three stages: basic, productive and creative. They consistently



provide: the formation of the basis for development of creative thinking of adolescents at the lessons of physical culture, development of cognitive capabilities that determine creative thinking (attention, memory, imagination) and formation of the base of movements and motor activities of pupils of the main school to create opportunities to realize creative ideas by means of motor activity; increase in the level of formation of autonomy, flexibility and divergent thinking; improving pupils' skills to generate new ideas through non-standard ways of solving motor tasks and combining motor skills to create new product activities.

Implementation of the proposed methodology allows increasing the level of development of creative thinking of schoolchildren, to create a developing educational environment that corresponds to the present-day vocabulary. It will promote upbringing of a new generation of people with creative thinking that will allow them to adapt more qualitatively to the changing conditions of the modern information society.

Further researches of the problem is expedient to carry out in the direction of using interdisciplinary connections for development of pupils' creative thinking in the process of physical education, and training of future teachers for this kind of activity.

Conflict of interests

The authors declare that there is no conflict of interest.

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