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MOTOR TRAINING OF PRIMARY SCHOOL PUPILS THROUGH SWIMMING

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CONCEPTUAL RESEARCH GUIDELINES

Actuality and importance of the problem addressed. Physical education plays a significant role in the training and development of pupils' personality, constituting the most important form of organizing the process of physical training, physical development, habits training and motor skills, but also acquisition of theoretical knowledge in the given field.

At the current stage, sociocultural realities determine the need to develop innovative approaches in the design of educational systems of different types and levels. Under conditions, where the volume of physical strength and the values of a healthy way of life are growing very quickly. The pedagogical society has signaled the tendency to promote the values of physical education through development, self-development and physical self-improvement. This fact is confirmed even by the real situation in the social environment, where pupils' interest in physical education has decreased, using modern information technologies and unlimited access to multiple social networks, they have replaced motor activities in the open air (dynamic games, sports competitions, etc.), this fact leading to the appearance of hypodynamia. Out of the total number of pupils of this age, healthy ones represent no more than 12%. The given situation is caused by the decrease in the standard of living of the population, by the deterioration of the environment, but also by the high incidence of diseases among them [4, 5, 6, 8].

At this age, the foundations of the physical culture of the personality and the value attitude of the child towards education are formed, the premises are generated for improving the level of motor training, this being one of the basic objectives of school physical education, including at the primary level. However, currently there are more and more alarming publications about the deterioration of the students' health, reducing the level of their physical development and motor training [13, 15, 16, 17, 27]. As a result, at this age, pupils show a certain anxiety in the processes of communication with peers and adults, which reflects negatively on the effectiveness of the educational process, against the background of the reduction of pupils' interest in the educational activities of physical culture.

Primary school pupils (7-10 years old) are considered to be of early school age, and both notions will be encountered during the course of this study.

Different studies confirm the fact that pupils lose physical strength from year to year, they do not sufficiently master the individual forms of physical training, thus lacking the desire to form an active attitude towards the physical education process. It should be noted that currently the insufficiency of motor training means is attested, especially those in swimming, the efficiency of which has been very often demonstrated both from a theoretical and practical point of view [3, 9, 18, 22, 23].

The analysis and generalization of the scientific and methodological literature in the field, the examination of the advanced pedagogical experience of the physical education teachers, of the swimming instructors demonstrate to us the fact that there are unused reserves in the organization of the physical education of primary school pupils to increase the level of physical training, as well as to decrease the cases of morbidity. Thus, one of these reserves is swimming, which represents the important factor, which, in current conditions of natural and socio-economic cataclysms, becomes a vital psychomotor skill. Unlike the other sports events, swimming is a particularity in the sense that it is practiced in water, a medium with a high density, which opposes a resistance during practice, greater than that of air, snow or ice. The development of the motor qualities characteristic of the swimmer is an important problem, their weight in achieving the performance is not equal, the characterization of the effort type specific to swimming is the resistance effort with its resistance-speed, resistance-force options [7, 10, 22, 23, 29, 30],

The problem of optimization and methodological assurance of the physical education process of primary school pupils through swimming means has been addressed by several authors [8, 10, 22, 23, 29, 30]. However, at present, the swimming training of pupils does not correspond much to the current requirements, which reflects negatively on the solution of the complex impact regarding the psychophysical and motor multilateral training of the personality of the primary school pupil [18, 21, 24, 25].

The need to develop and implement the pedagogical technology for physical education of primary school pupils, regarding the expansion of opportunities with a developmental, cognitive, healthy and applicative nature, became a promoting factor for updating and addressing the given problem.

The purpose of the research consists in researching the effectiveness of applying swimming means in physical education with primary school pupils.

Research objectives:

1. Studying the conceptual guidelines of the school-age pupils' motor training through swimming.
2. Assessing the level of motor training of primary school pupils.
3. Elaborating the experimental program content of primary school pupils' motor training by applying the swimming means.
4. Theoretical foundation and elaboration of the motor training pedagogical model of primary school pupils through swimming means.
5. Experimental validation of the effectiveness of the implementation of the pedagogical model and the experimental program of school-age pupils' motor training through swimming means.

Research hypothesis: the motor training of primary school pupils will be effective if: we analyze and determine the conceptual, theoretical and practical guidelines of the targeted process; we will determine the level of motor development of school-age pupils who practice swimming; we will develop and validate the effectiveness of the pedagogical model and the experimental program of the school age pupils motor training through swimming means.

Important scientific problem solved in the field resides in the low level of motor training of primary school pupils, the lack or insufficient number of guides and promotional materials related to optimizing the physical education of primary school pupils through the use of various means, including those from swimming event.

The conceptual theoretical-methodological basis of the research represents: the psychological theory of developmental education (M. Stoica, V.V Davydov, D.B. Elkonin); the conceptions of building technological systems in pedagogy and psychology (V.P. Bespalko, J.K. Kholodov, V.M. Monakhov, S.D. Neverkovich, G.V. Khozyainov); current approaches regarding the theoretical and methodical development of swimming didactics (N.Zh. Bulgakova, D.B. Bilyka, V.Yu. Davydov, T.V. Ermilova; I.E. Kozhevnikova, T.A. Protchenko, Yu.A. Semenov, E.A. Sergeevich, L.I. Shirokanova); conceptual ideas about pedagogical systems of physical culture and personality (Danail S., Epuran M., V.I.Lyakh, A.M. Maksimenko, A.P. Matveev, L.P. Matveev).

Research methods:

The following methods were applied in the research: *generally scientific* (the theoretical analysis of pedagogical and methodological literature regarding the studied problem; analysis of school documentation and pupils' medical files; synthesis, specification, generalization, systematization, modeling, research and dissemination of advanced pedagogical experience (pedagogical observation, conversation, questioning, investigation of coaches, testing, pedagogical experiment, quantitative and qualitative processing of research results, interpretation, mathematical processing of statistical data and their presentation.

Scientific novelty and originality consists of the theoretical and experimental elaboration and validation of the basic concept related to the motor training of school age pupils by the elaboration and practical implementation of the pedagogical model and the experimental program focused on the means taken from swimming event.

Theoretical significance resides from specifying the theoretical-applicative foundations of motor training for 7-8-year-old pupils through swimming means, from the consolidation and scientific argumentation of *the pedagogical model and the experimental program,* by developing the pedagogical technology regarding motor training by applying swimming means.

The applicative value of the work consists in exposing and validating the set of pedagogical tools and theoretical-applicative foundations, reflected in the components of the pedagogical model and the experimental program of motor training of primary school pupils by applying swimming

means. The results of the research in question can be successfully applied by school teachers working with primary school pupils, as well as in the professional training of the higher education institutions of physical education and sports students.

Implementation of scientific results. The results obtained were implemented in the training process of primary school pupils in the discipline of "physical education" in primary school no. 12, Chisinau into two groups (the control group and the experimental group), the groups being made up of pupils aged 7-8 years, as well as within the training process of the continuous professional training department of the State University of Physical Education and Sport, in order to determine the situation in the researched topic, but also by validating *the pedagogical model and the experimental program of motor training of primary school pupils through swimming means.*

1. CONCEPTUAL GUIDELINES OF THE SCHOOL PUPILS MOTOR TRAINING THROUGH SWIMMING MEANS

Ensuring the optimal physical development and good physical condition of children, depending on their age, is one of the tasks faced by the physiology, pedagogy, theory and practice of physical education. The early school period is characterized by an intense physical development of the person. At this age, the formation of practically all motor skills of vital importance takes place, and the most intense rates of growth of the indicators of basic physical qualities are recorded, which decrease significantly in adolescence. The loss of the favorable period for the development of a certain motor quality is very difficult to compensate later.

Numerous scientific studies [2, 14, 19, 20, 28] are dedicated to the development of children's physical qualities, and their results were the basis for the development of educational programs and activity methods with small school aged children.

The growth and development of children, the state of their physical and neuropsychic health are of great social and medical importance. The rate of growth and development of a child is influenced by a complex of - genetic, biological, daily life, food and socioeconomic factors [16, 17, 27, 28].

Before school, there occurs a jump in growth, that is, the height and weight indices of the body increase, its proportions change. The speed of these changes is not the same in all children and reflects their biological age. Intensive growth, associated with insufficient development of muscles, ligaments and tendons, can increase the pressure on the spine and cause disorders of the locomotor system.

According to the data of the specialized literature [2, 5, 13, 16, 27] the level of physical development is an important criterion for a complete assessment of the health status of children and adolescents. Physical development is influenced by factors such as heredity, socioeconomic conditions, the state of the environment, such as study and living conditions, nutrition, the level of physical activity, the influence of harmful habits, smoking, consumption of alcohol and psychoactive substances, inappropriate sexual behavior, etc.

The study of physical development, despite its apparent simplicity, is a very complex process, because it requires the solution of several interconnected tasks: firstly, the assessment of the level of physical development of the individual at the time of testing and in dynamics, and secondly, the assessment of the physical development of the population category at that time and in dynamics [3, 5, 13, 16, 27].

Summarizing the above, we can give the following definition of physical development: physical development is a complex indicator that characterizes the state of health of both an individual and a group of people at different age periods of their lives, comprising a set of anthroposcopic, anthropometric and anthropophysiometric indices, characteristics that undergo continuous changes in accordance with biological laws and under the influence of environmental factors.

A person's physical development is diverse and complex. It includes such an extensive and varied complex of traits that it is impossible to characterize them exhaustively. Therefore, from the whole variety of qualities of physical development, a minimum number must be chosen, which

includes the most important ones and which, if possible, objectively corresponds to the majority of requirements.

From year to year, more and more publications are focused on the widespread use of swimming as a sport, which can increase both the level of physical development and motor training, the latter being one of the basic objectives of school physical education, including at the primary level.

In their scientific works the authors [1, 11, 12, 18, 21, 26, 28] put special emphasis on the effect of swimming on the human body. First of all, this fact is related to water, namely the immersion of the human body in water. It is known that water has many beneficial properties, due to which swimming has a healing effect on a person. For example, water has a high thermal conductivity, which explains its strong quenching effect.

Being systematically in the water during swimming lessons has a calming effect on the child's nervous system, increasing emotional stability, giving him a healthy, restful sleep, a fact that increases his intellectual work capacity [12, 18, 21, 26].

I.A. Iurov [30] presents a number of distinctive features of swimming as a type of training activity:

1) manifestation of muscle activity in different forms;
2) obtaining a level of both special and general physical training;
3) acquiring, at a sufficiently high level, the technique of performing physical exercises;
4) assimilating and improving certain motor skills and developing the necessary physical and mental qualities;
5) orientating towards the maximum manifestation of physical and mental forces.

Also, Teodorescu D.T. [13], Grimalschii T. et al. [4], Jurat, V., Potop, L., Potop, V. [5] argue that already in childhood it is necessary to take care of the full development of the child's motor qualities, which can be improved both during natural development and under the influence of pedagogical means.

Following the analysis of the publications of several specialists in the field of physical education and sports, several conclusions were formulated, among which the early school age is one of the most effective for the development of motor skills, given the fact that the sensitive periods for most motor skills fit perfectly in this period of time, and the main role regarding their development rests with the specialized teaching staff.

This age is considered moderate in terms of the pace of physical development, here some particularities of physical development can be highlighted, which characterize the uneven development at this stage.

The respective age period is characterized by several physiological and anatomical changes in the body of pupils, and these differ to some extent in boys and girls, this being clarified by the so-called pubertal period of pupils' development at the given age.

Following the research carried out by several specialists in the field of physical education and sports, it was found that swimming is one of the most indicated and effective sports recommended for practice, regardless of age and gender.

2. THE ORGANIZATIONAL AND METHODOLOGICAL BASES OF APPLYING SWIMMING MEANS IN THE PROCESS OF PRIMARY PUPILS MOTOR TRAINING

Organization of research

In accordance with the research aim, objectives and methods, the research was carried out in four stages.

In the first stage of the study, an analysis of the scientific and methodological literature was carried out, the purpose and objectives of the research were determined, and the methods regarding the research problem were selected.

In the second stage of the study, the most appropriate testing methods were determined and the confirmatory experiment was carried out, one of the main tasks of which was to determine the level of motor training of the pupils involved in the experimental study.

For this purpose, during the period September 2021 - February 2022, at the swimming lessons held at School no. 12 "Anatol Popovici" Chisinau, 68 school age pupils were examined. 2 homogenous groups were formed according to the tested indices: EG (physical education lessons with swimming means) and CG, where pupils trained according to the traditional program. The pilot study involved boys and girls of young school age (7 years), who did not differ in anthropometric characteristics.

The physical education classes with the experimental group were held by qualified teachers with a minimum of 10 years of experience in teaching the subject "physical education".

In the third stage, in the period (2021-2022) the basic pedagogical experiment was carried out, under the conditions of School no. 12 "Anatol Popovici" Chisinau. To carry out the experiment, two groups of girls and boys from the 2nd grade were organized (the experimental group and the control group). Thus, the following actions were taken: evaluation of the effectiveness of the experimental pedagogical program for motor training of 7-8 year-old pupils through swimming.

The fourth stage (final) was dedicated to analytical analysis and generalization of experimental data, formulating conclusions and practical recommendations, improving the doctoral thesis.

Assessment of the motor training level of the pupils included in the experimental study

In order to assess the level of motor training, but also the swimming abilities of the primary school pupils, a confirmatory experiment was organized where pupils who were going to be part of the basic experiment had to demonstrate their swimming abilities as well as their basic motor abilities.

In order to demonstrate their swimming abilities, eight tests were proposed (floating, star on the chest, star on the back, Slipping through water, exhaling in the water, legs dragging with a board in the hands), the simplest of the swimming tests, which the pupils of both groups (CG, EG) were to perform (Table 1).

Table 1. The level of training for swimming of elementary school pupils at the initial stage of the experiment, average values

No.	Control test	The groups	
		CG	EG
1	Board (sec)	6,06	6,39
2	Star on chest (sec)	6,05	6,03
3	Star on back (sec)	4,15	3,87
4	Slipping through water (m)	4,88	5,15
5	Exhalations through water (points)	2,4	2,2
6	Leg Crawl with hands on a board (points)	2,2	2,2
7	Breath holding on inhale (sec)	8	8
8	Breath holding on exhale (sec)	14,6	14

The table above reflects the results of testing the initial level of mastery of the elements of the swimming test of the control and experimental groups (floating (sec), star on the chest and back (sec), slipping through water (m), exhaling through water, crawl legs (points), breath holding during inhale and exhalation (sec). The results of the control tests are presented as mean values for each group, i.e. the arithmetic mean of the control group and the experimental group was calculated, at the arithmetic mean. The control tests "exhale in water" and " crawl legs with hands on the board" were evaluated according to the point system and calculated according to the same principle as other values.

The recorded results demonstrated a fairly pronounced homogeneity in all the tested indicators, their acquisition level being a relatively weak one, given the fact that not all pupils

attend swimming lessons. However, the groups are equal in terms of values, which allowed the planning of the basic pedagogical experiment.

In the ascertaining experiment, we were particularly interested in the level of motor training of primary school pupils aged 7-8 years. In this case, they were tested on several motor indicators, eight in total, and in the summary we will present the three most important in our opinion, here it is about the Romberg Test, which demonstrates the level of development of coordination of movements, the flexibility development test, which indicates mobility in the joints and the Spirometry test, which indicates the vital volume of the lungs.

The measurements made for the assessment of static coordination indicate that, in the experimental group, at the initial testing, 18% demonstrated high results, 30% average results, and 52% low results. In the control group, respectively, high results were shown by 35%, average results were recorded at 35%, and low results at 30% of school age pupils.

The Romberg test (table 2, fig. 1.) quantitatively determines the ratio between the visual and proprioceptive systems in controlling balance in the basic position.

Most of the decreased indices in both the experimental and control groups are caused by the processes of overwork and fatigue in pupils. These indices act as a determining factor that carries information about the insufficient formation of a dosed movement in the body.

The Romberg coordination test is used before and after training. The time to complete it may be due to fatigue, overstrain, various ailments, as well as long breaks in the practice of physical culture.

Table 2. The results of the Romberg test for school age pupils at the initial stage of the experiment (%)

Level	CG		EG	
	Number of pupils	%	Number of pupils	%
High	12	35	6	18
Average	12	35	10	30
Low	10	30	18	52

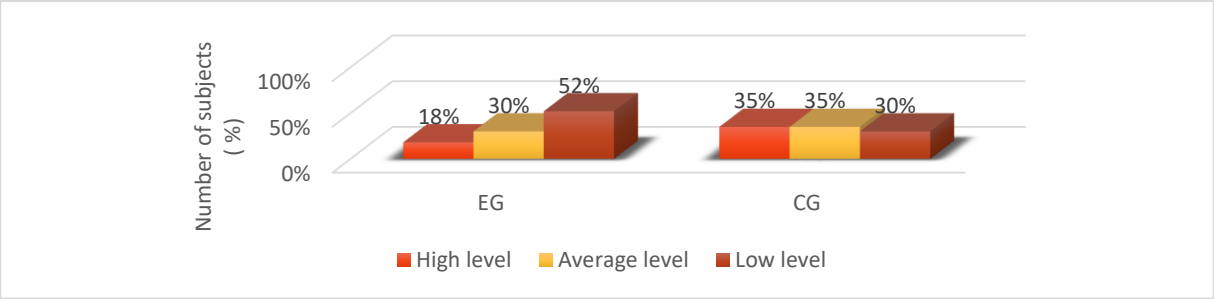

Fig. 1. Romberg test results at the initial stage of the experiment (%)

Analyzing the results of the first test, the Romberg Test, it is clearly observed that they are very close in terms of values for pupils from the control and experimental groups, and this speaks of their homogeneity, that is, the groups are equal in terms of values for these indicators.

Another test subjected to analysis was the flexibility test, which consists of bending forward from the initial position "sitting on the floor", and the data obtained are presented in Table 3 and in Figure 2.

Table 3. The level of flexibility development in school-age pupils at the initial stage of the experiment (%)

Level	CG		EG	
	Number of subjects	%	Number of subjects	%
High	10	29	8	24
Average	14	42	14	42
Low	10	29	12	34

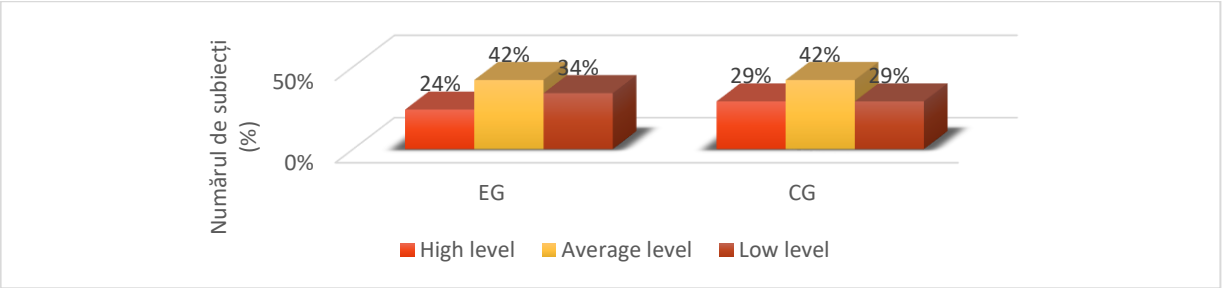

Fig. 2. Indices of the level of suppleness development in EG and CG at initial testing %

The analysis of the data obtained from the assessment of suppleness revealed that, in the experimental group, 24% of the young schoolchildren recorded high results, 42% had average results, and 34% demonstrated low results. In the control group, 29% showed high results, 42% had average results, and 29% showed low results.

The low level of flexibility development is explained not only by the anatomical and physiological characteristics of the body, but also by the gaps in the methodology of developing this quality, especially when the efforts are directed in particular to stretching the antagonistic muscles, and not to increasing the strength and amplitude of the contracting muscles. It seems that, in practice, it is not the active suppleness that is formed more often, but the passive one.

However, the differences between both groups are insignificant, which speaks of the homogeneity of the research groups.

The third test subject to pedagogical analysis was the Spirometry test, which assesses the level of the vital volume of the pupils lungs included in the research, this being more of a physiological test (table 4., fig. 3.).

Table 4. Results of Spirometry (VP) at the initial stage of the experiment, (%)

Level	CG		EG	
	Number of subjects	%	Number of subjects	%
High	12	35	8	24
Average	12	35	18	52
Low	10	30	8	24

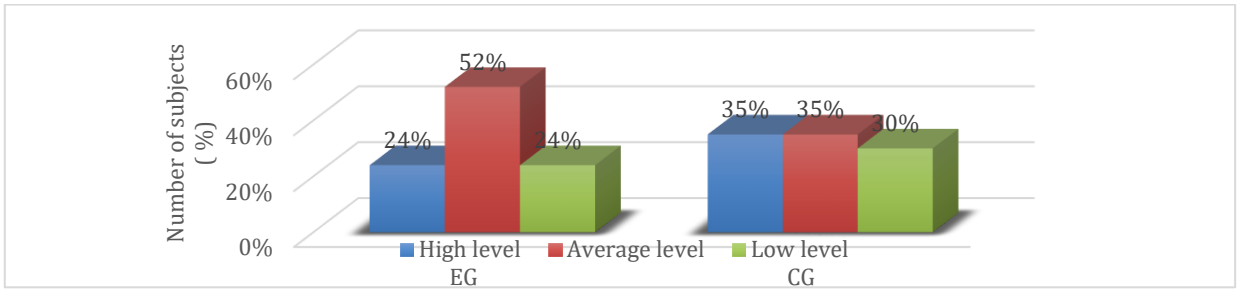

Fig. 3. Results of spirometry (VP) in EG and CG at the initial stage of the experiment, (%)

The data recorded using the spirometry method indicate that, in the experimental group, 24% demonstrated high results, average results - 52%, and low results - 24%. In the control group, according to these results, 35% had a high level, 35% - an average level, and 30% demonstrated a low level.

The parameters of the lung volume indices reflect deficiencies in the mechanism of the function of external breathing and, as a result, an insufficient development of the ability to maximize the duration of exhaled air. The low indices of the applied test are correlated with the processes that reflect the low level of motor development and, as a result, of the resistance of the respiratory organs. However, the results from both groups are quite close in terms of values, and this indicates the homogeneity of the groups, a fact that allows the initiation of the basic

pedagogical experiment regarding the use of the means from the swimming test in physical education lessons with preschoolers.

Approximately the same trend is observed in the case of the other tests subjected to testing, where it is quite clearly observed that the level of motor training is quite modest for the given age, and the groups involved in the ascertaining experiment are homogeneous in this respect, a fact that allows the initiation of a large-scale pedagogical experiment to highlight the effects of the application of swimming means to optimize the level of motor training of 7-8 year-old pupils.

Pedagogical observations and surveys carried out among specialists have revealed that the existing approaches to the motor training of primary school pupils are mainly of an instructive-educational nature, for learning new exercises, being mainly applied the mechanical execution of one or another exercise, games used in the final part of the lesson.

For primary school pupils, the main means of the motor training process, including the use of swimming elements, is the game, which is applied in a proportion of 40-50% of the physical education lesson volume.

3.THE EXPERIMENTAL APPROACH OF PRIMARY PUPILS MOTOR TRAINING BY USING SWIMMING MEANS

The content of swimming lessons

In order to organize specialized physical education lessons in swimming event, it is necessary to use additional equipment in the process of teaching pupils to swim - goggles, breathing tube and fins - with the role of facilitating the assimilation of the technical elements of swimming.

Swimming lessons are conducted according to didactic principles: awareness and active spirit, systematic and consistent basis, accessibility, intuitive, strength.

At each new lesson, in addition to the new exercises, the already mastered ones are repeated three or four times consecutively.

Thus, constantly assimilating new material, they thoroughly perfected what they had previously studied. Such an approach makes it possible to form a very plastic and at the same time quite strong stereotype of swimming movements in younger schoolchildren.

Lessons took place twice a week, each lasting 45 minutes. In the first 2 months, the lessons were held according to the general school schedule, after which the they took 7 tests to highlight the mastery level of the main elements of the swimming, namely: " Board ", "Star on the chest", "Star on the back", “Slipping through water”, “Exhaling through water”, “Crawl legs- hands on board”, “Breath holding in water (15 seconds)and on dry land (30 seconds)".

For the development of motor skills, it is recommended to actively use psychotechnical games and exercises throughout the lesson, on average 4-5 exercises in each lesson. These exercises increase the emotional background, provide more information about the motor action being studied, develop interest in the competition, highlight internal landmarks and reduce fatigue.

Improving the swimmer's motor skills in the initial training stages through the use of physical exercises of general and special development is achieved faster and more efficiently than with the help of swimming equipment. Therefore, the preparatory part of each swimming lesson necessarily includes a complex of physical exercises of general and special development on dry land, the content of which is determined by the objectives of each lesson. The implementation of such a complex prepares beginners for the successful assimilation of teaching material in the aquatic environment.

Apart from this, the content of the swimming lessons will also be programmed according to the sports training factors, such as physical training, technical training and to a lesser extent, tactical and theoretical training (Table 5).

If we are to briefly analyze the content of each compartment presented in the table above, they are focused on several concrete objectives.

Table 5. Motor training plan for school pupils by applying the swimming means

Tasks	Actions
Theoretical training: Consolidation of knowledge regarding the health and applicative importance of swimming. Expanding knowledge of water sports. Forming a clear image of correct movements through sports procedures. - Rules of conduct in the pool.	Conversations, viewing pictures, discussing films and photographs, exercises, graphic representation of outdoor games.
Practical training: 1. Preparatory exercises on water 2. General training in water Special training exercises - Entering the water independently. General physical training exercises in the swimming hall on dry land Walking in the gym: on the toes, on the heels; side step, kneeling; crouched, meandering longitudinally and transversely. Running in water: with alternate walking, in different formations, on the back, with the knees up, helping with the hands. Movement in water by jumping: throwing legs forward, diving; with jumping out of the water, removing a suspended object; pushing the water with hands. Underwater diving: collect objects from the bottom, holding your breath (for 8, 16, 20, 32 counts); with eyes open to gather parts of the whole. Teaching and strengthening the technique of performing exercises in whole and on elements in the gym and in the water. - Practicing the movements of the arms and legs as in crawl and breaststroke stroke: in the gym, in water; from different positions, on the spot, in motion, with support, in a different rhythm, in accordance with breathing. - Slipping on the chest: with support on the board, free slipping; only with the help of the arms or legs, as when swimming in a crawl stroke; with a turn of the head for inhaling; with repeated inhalation and exhalation, pushing with one leg from the side. – Slipping on the back: with support on the swimming board and without support; with legwork, combining the movement of arms and legs; side push with one leg, pushing with the legs from the edge of the pool, holding on the railing (water start). - Front and back crawl: with the help of the legs or arms; with support on a swimming board, on the edge of the pool; simplified crawl, without taking hands out of the water; combining arm and leg movements; with the coordination of hand, leg and breathing movements. – Breaststroke : with the help of the legs (with support on the board, the pool wall); free swimming, with the help of arm movements; combining hand and leg movements; combining the movements of arms, legs and breathing, swimming in coordination.	Psychotechnical games for the development of motor skills are recommended to be included from half of the lessons in their total number: exercises and games to develop the skills of coordination and speed, strength, flexibility, games of immersion in water, holding the breath and performing the correct exhalation in water.

Theoretical training, includes:

- Consolidation of knowledge regarding the health and applicative importance of swimming.
- Expanding knowledge of water sports.
- Forming a clear image of the correct movements through sports techniques.
- Rules of conduct in the pool.

Practical training of the swimmer is oriented towards the complex and multilateral action on the athlete's body, taking into account the specifics of swimming, having the following objectives:

● multilateral development of the athlete's body, increasing the level of development of resistance, strength, speed, suppleness, skill and, based on these qualities, creating the functional capacities necessary to achieve high results;

● strengthening the health of pupils, hardening the body, developing immunity to temperature changes;

● ensuring, during periods of reduced training efforts, special active rest breaks by changing the applied exercise times;

● increasing the level of volitional training of pupils by overcoming additional difficulties.

There are used the following *means* for 7-year-old pupils who practice swimming:

● front exercises, walking and running; walking and running movement; walking and running in the opposite direction and diagonally; the usual walking, on the toes, on the outer and inner parts of the foot with different positions of the hands; running on toes; alternating running with walking etc.

● general development exercises: exercises for arms, neck, trunk, legs from various initial positions (mainly for suppleness, coordination, relaxation); exercises to strengthen the muscles involved in the swimmer's arm movements; stretching and mobility exercises in the talocrural joints; exercises that imitate the technique of swimming sports procedures, starts, turns;

● upper body and shoulder girdle exercises;
● trunk and neck exercises;
● lower limb exercises;
● joint stretching and mobility exercises;
● imitation exercises;
● exercises with weights (medicine balls weighing up to 2 kg, dumbbells up to 1 kg, etc.);
● jumps;
● acrobatic exercises (must be performed with support), forward and backward rolls with the body grouped; the dorsal bridge; exercises on the shoulder blades, etc.;
● mobile and sports games.

On land, means of practical training include exercises on special apparatus, in water - most types of training efforts. It includes actions on the muscle groups, body systems and energy mechanisms that determine success over a given swimming distance. The main means are competitive and various special training exercises.

The essential methodological principle is that of dynamic one, which includes the following requirements:

● matching the trajectory of training and preparatory movements with the basic competitive movement;
● correlation of training efforts (frequency of movements) and rhythm;
● respecting the time interval of the activity.

The practical training on land provides:

● mobility of the humeral joints;
● spine mobility;
● talocrural joint mobility;
● land pull when imitating dolphin- hand stroke and others;

● simulation exercises for acquiring and perfecting the technique of sports swimming styles, starts and, such as: movements of the arms and the trunk, as in the front crawl, backstroke, breaststroke, butterfly in combination with breathing and holding the breath; imitation on the gymnastic mat of groupings, jumps and rotations, which are elements of the technique of turns on the front and back;

● exercises on training simulators for developing strength and endurance of muscle groups that are important in swimming; special exercises with rubber dampers and portable block-type machines;

● stretching and mobility exercises, which ensure the free execution of movements with a large amplitude in sports swimming, such as: oscillatory, spiral or helical movements of the arms and legs with an increasing amplitude at the level of the shoulder, ankle, knee and hip joints; undulating

movements, turns, flexions and extensions of the body in the lumbar, thoracic and cervical regions, etc.;

● resistance exercises with a duration, nature and form of movements corresponding to the main training exercises in the water. For example, similar to the exercise of 8 x 50 m breaststroke legs with 30 second breaks, the athlete performs on dry land and with the same rest breaks 8 sets of squats (45 seconds each) with the leg position characteristic of breaststroke swimming. To develop resistance and general work capacity, circuit training is used with a duration from 20 minutes (in the 1st year of training) to 40-60 minutes (in the 4th year);

● general physical development and acrobatic exercises (without objects, with a partner, in hanging support);

● mobile and sports games, relays with elements of general development exercises.

Preparatory exercises for accommodation with water:

● moving on the bottom of the pool by walking, running, jumping, holding hands and in various initial positions of the hands (on the back, stretched up, etc.); moving with a change of direction (snaking, in a circle, etc.);

● movement of arms and legs with change of directions and planes from different positions, tense and relaxed;

● moving on the bottom of the pool by walking and running with the help of paddling movements of the hands;

● diving into water holding your breath and opening your eyes underwater.

Breathing exercises: from different starting positions, long inhalation and "explosive" exhalation after holding the breath (both on the surface of the water and in the water):

● lying down, slipping on the front and back with hands in different positions;

● slipping by pushing with one and both legs from below and from the side;

● slipping with rotation;

● side slip;

● slipping with basic paddling movements with arms and legs.

Exercises for learning the technique of swimming sports procedures, of starts and rolls:

● front and back crawl: movement of legs, arms, breathing; coordination of movements with legs, arms, breathing; coordination of leg and arm movements with breathing; general coordination of movements;

● breaststroke: movements of legs, arms, breathing; coordination of leg and arm movements with breathing; general coordination of movements;

● dolphin: movements of legs, arms, breathing; coordination of leg and arm movements with breathing; general coordination of movements.

● simple open and closed rolls in front and back crawl, breaststroke, dolphin ;

● starting starts from water and starting base. Start from water for the backstroke distance.

Training jumps: jumping from a low side: a fall into the water from a sitting or semi-sitting position; jumping into the water from a standing position, leaning from the side, from the starting base, from a trampoline with a height of one meter; jumping off a meter high trampoline.

Improving the swimming technique in front and backstroke crawl, breaststroke, dolphin strokes: swimming with the help of movements performed with one hand; swimming with the help of the movements of one hand, the other is stretched forward or next to the body (only for front stroke or back stroke crawl); swimming with the help of leg movements with different hand positions; swimming with full coordination of movements; improving breathing technique. To improve the technique of making starts and turns, the following exercises will be used:

● Front and backstroke crawl, breaststroke, dolphin strokes with an emphasis on technique, gradually increasing the length of the distances covered.

● Repeated swimming with emphasis on technique and with the help of arm or leg movements at distances of 25, 50 m.

● Relay swimming using sports methods (in full coordination of movements with hands and legs).

● Exercises for the in-depth assimilation of the technique of the swimming sports methods , start and turns.

● Front crawl: swimming with full coordination of movements; swimming using only hand movements; swimming only with leg movements with different hand positions and breathing; swimming " hand exercises ", swimming with "beating the opponent", swimming with "bilateral" breathing; swim every third row; crawl swim in two, four and six strokes; crawl with holding the breath etc.

● Backstroke: swimming with full coordination of movements; swimming with the help of simultaneous and alternating movements of the hands; swimming with the help of the movements of the legs and one hand; swimming with "replacement", "beating"; swimming on "delayed movements"; inhaling swim to both left and right hand; swimming with the help of leg movements with different hand positions; swimming with the help of crawling movements of the legs and simultaneous movements of the arms, etc.

● Dolphin: swimming with full coordination of movements; swimming with the help of dolphin-style arms and crawling legs; swimming with the help of dolphin legs and rowing with one hand, the other is stretched forward or held at the hip; swimming with dolphin-style leg movement on back, chest and side positions with different hand positions; backstroke with dolphin-style leg movement and simultaneous arm movements; swimming with two and more dolphin strokes in separate coordination of movements with arms and legs; continuous coordination swimming of the arms and legs movement ; swimming in the dolphin procedure in two strokes with holding the breath, breathing after 2-3 cycles, breathing for each cycle of arm movements.

Breaststroke: swimming with full coordination of movements; swimming with the movement of the hands; swimming with leg movement (arms extended forward; hands by thighs); swimming with coordination, separate arm and leg movements and continuous coordination; swimming with different breathing options; backstroke with continuous coordination of arm and leg movements; breaststroke while holding breath, etc.

Turns: flip forward without touching the wall with the hand swimming breaststroke; turning "pendulum" with two hands touching the wall in breaststroke and dolphin strokes; open and closed turn with legs up in the air in the backstroke ; turns when changing from the dolphin to the backstroke, from backstroke to the breaststroke, from breaststroke to back one.

Starts: variations of the starting technique from starting base in front crawl stroke, breaststroke and dolphin stroke (with arms swinging forward, with circular movements of the arms); start from the starting base; swing start; start from water in backstroke; start from the starting base during the change of the relay race stages. Basic exercises for perfecting swimming technique, starts and flips; swimming at a free and moderate tempo with an emphasis on technical skills over distances of 100m, 200m in strokes: front crawl, backstroke; dolphin 100 m, technical swimming in the mixed procedure at distances (100, 200 m changing style after 25, 50 and 100 m) in free and moderate tempo; swimming at a moderate tempo in various strokes with an emphasis on the technique of arm or leg movements at distances from 200 to 300 m; swimming at a moderate tempo with an emphasis on execution technique with full coordination of movements and with the help of leg or arm movements in all strokes, such as: 3-4 x 100 m, 2-3 x 200 m; swimming segments of 25 and 50 m with increased speed with an emphasis on technique in all strokes with full coordination of movements, as well as with the help of movements performed with arms or legs in exercises, such as: 4-6 x 25 m with a start in various methods, 4-6 x 50 m with the help of arm or leg movements, alternating swimming styles and rhythm, 4x50 m in each swimming style, etc.;

Rep. Swimming , 10 to 15; 25 and 50 m in all strokes in full coordination of movements or with the help of arms or legs movements etc.

Psychotechnical games and exercises for the development of motor skills of school children who practice swimming:

● to start the lesson, on land: "Line up by height", "Edible - inedible", "What's changed?", "Everyone to flags!", "Mouth-helmet", "Be careful!", "Listen to the signal!";

● exercises and games to develop speed, strength and coordination capacities, to develop flexibility;

● games aimed at learning breathing: "Hot tea", "Bubbles", "General breathing", "Relay race with moving toy";

● games aimed at learning to dive and float: "Float", "Who will hide under the water faster", "Go under the bridge", "Float competition", "Divers", "Stay on the bottom", "Corals", "Trailer", "Hunters and ducks";

● games for the development and strengthening of swimming movements: "Motor", "Pool", "Boat Race", "Careful", "Mill", "Rolls", "Boat", "Hold the board", "Crystal balls". ", "Who holds on longer?", "Fight for the ball", "Caterpillar", "Egg competition";

● water diving games with breath holding and correct exhalation in water: "Funny faces", "Submarine", "Treasure hunt", "Pass the ball"; exhalation exercises under water: "Pump", "Collar", "Slipping on the front with exhalation through water", "Rhythmic inhalation and exhalation in combination with leg movement".

All the means used in the formative experiment were distributed for the school year, according to the allocation of hours in Appendix 1, 2, 3.

After a detailed analysis of the means for learning to swim was done, a Pedagogical Model for their implementation in the process of physical education of 7-8 year-old pupils was also applied (fig. 5.).

Thus, the respective model served us as a guide for the implementation of the means planned in physical education lessons in order to solve the above-mentioned problems and with the aim of creating a beneficial environment for the formation and strengthening of health and an effective organization of the instructive-educational process regarding the motor training of 7-8 year old pupils through swimming means .

This model does not claim to be a perfect and completed one, it can be completed, modified depending on the purpose and objectives of the research, the conditions of the training process within school physical education and others.

To begin with, this model is focused on three basic objectives, which are also fully related to school physical education, which are educational, training and development. All of these are fully dependent on the environment in which the motor training process of primary school pupils is organized, these being mostly the school, the family and necessarily medical assistance, absolutely necessary in any training conditions.

Once the emphasis is placed on the development of motor skills, it becomes clear that an important place in the content of the given model is occupied by the content of motor training, which in turn refers to the four factors of motor training, which are:

- general physical training,
- specific physical training,
- technical-tactical training,
- psychological training.

Next, the presented model focuses on several components such as training:

- technological,
- diagnostic, evolutionary.

All the components listed above are provided with specific contents of the given components, which ultimately ensure the efficiency of the finality and the valorization of the motor training process of 7-8 year-old pupils by using swimming means.

The given model was implemented in the training process, the role of which was to guide the teaching staff regarding the selection and implementation of the means taken from the swimming event in the physical education process with primary school pupils. The effects of the implementation of the swimming means proposed for the pedagogical experiment are presented in the following subsections.

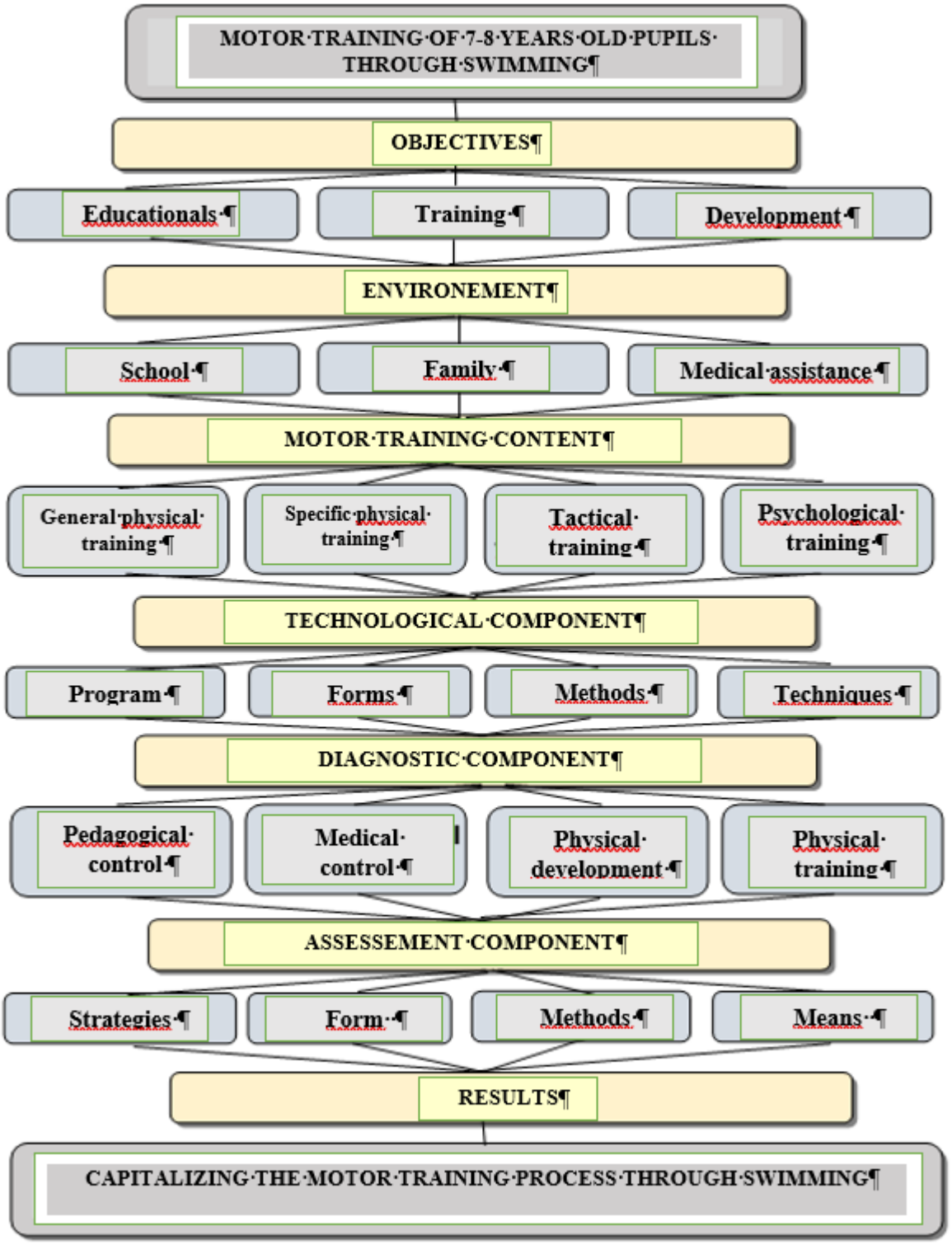

Fig. 4. The pedagogical model of motor training of primary school pupils by applying swimming means

The level of mastering the swimming event elements

One of the basic objectives of our research was to research the effectiveness of acquiring the technical elements and methods of swimming event by 7-8 year-old pupils within the pedagogical experiment. In this regard, eight indicators were selected that actually express to some extent the level of mastering swimming methods, these being presented in the table below (table 8).

Table 6. The data of the control tests regarding the mastery of the elements and technical methods in the swimming event

No. ctr.	Control test	Groups		Difference
		Control group	Experimental group	
1	Board (sec)	9,39	12,52	3.13
2	Star on chest (sec)	9,29	13,62	4,33
3	Star on back (sec)	6,05	9,53	3,48
4	Slipping through water (m)	7,46	11,26	3,80
5	Exhalations through water (points)	4,23	5,00	0,77
6	Leg Crawl with hands on a board (points)	3,47	4,41	0,94
7	Breath holding on exhale (sec)	13,67	14,94	1,27
8	Breath holding on inhale (sec)	26,47	30,23	3,76

In Table 6, only the final results of mastering the elements and methods from swimming are presented, given the fact that at the beginning the pupils did not master these skills and did not attend swimming lessons.

The first test that was subjected to analysis was the so-called "board", which represents the time pupils stayed afloat in the two groups participating in the experiment.

According to the table above, we notice that the pupils from the experimental group mastered the element of staying afloat better than those from the control group, with a result equal to 12.52 seconds, compared to 9.39 seconds for the ones from the control group, the difference being 3.13 seconds. At first glance it would seem that the difference is not too big, however staying afloat 13 seconds longer is a pretty good result.

The next two tests are also water staying afloat tests, they are called the star, in one case the "star on the chest", in the other case - the "star on the back".

The two tests represent the same front and back float board, only with the side arms, without making any movements from any part of the body. We note that during the initial testing the pupils from the control group in the first case recorded a time equal to 9.29 seconds in the front test and 6.05 in the back test. At the final test, the experimental group demonstrated much more pronounced results compared to the ones in the control group, recording in the first case a result equal to 13.62 seconds, and in the second case – 9.53 seconds. In the first case the difference was 4.33 seconds, and in the second 3.48 seconds, thus, the differences being quite significant.

Therefore, physical education lessons using the means from the swimming test can be quite effective when we refer to teaching pupils to stay afloat through water, this being quite well demonstrated by means of the two tests applied in the pedagogical experiment.

A rather important element for teaching pupils to swim is the " slipping through water", which is a push from the pool wall and making the greatest possible slipping through water, that is, pupils must slip the maximum possible distance in this case. Analyzing the results of the acquisition of this element by the pupils from the control group and the experimental group, the priority of the experimental group can be clearly observed at the end of the pedagogical experiment, who were able to slip through water for a distance of 11.26 meters, compared to 7.46 meters by the pupils from the control group.

It is worth noting that both groups improved their given indicator, demonstrating quite good results after a year of practicing the swimming means.

In fact, slipping is a basic element without which the pupils will not be able to learn any swimming stroke, a fact for which the teaching staff will always draw the due attention to its learning.

An important role in teaching pupils to swim is their ability to hold their breath though water. When the pupil holds his breath, he tenses up and it is difficult for him to master the swimming

technique. When you hold your breath, you feel the need to breathe, and the sensation is not from the lack of oxygen, but from the accumulation of CO2 in the body. By holding your breath, carbon dioxide is retained in your blood and lungs - and this creates the feeling of needing air. Constantly exhaling while the pupil swims gives a more pleasant sensation - CO2 is released and the need for air is no longer felt. When the lungs are full of air it is quite difficult for the position of the body - in this case the chest has more buoyancy. Since the body acts like a swing around the waist, this can cause the legs to sink too far into the water causing a slowdown in swimming speed. Analyzing the results recorded in the pupils after the correct performance of the "exhalation through water" test, we noticed that at the end of the experiment the members of the experimental group have a higher result than the control group, the difference being 0.77 seconds.

Exhalation should be done gradually during the duration of a stroke, if the child holds air and exhales suddenly at the end of the stroke, then the child may take the head out of the water before time and will execute the swimming technique incorrectly.

The next test we analyzed was the *Leg Crawl with hands on a board*, active phase being composed of the leg movement from pelvis joint.

When performing this test, the knee is slightly bent and the foot is extended and pointed inward (like a propeller blade). In the last phase, a water kick is executed through the whip movement of the hand paw. The ankle will perform a hyperextension movement of the foot, following the pressure exerted by the water. Passive phase it is given by the movement of the foot that goes to the initial position, the heel coming out a little above the water. The range of motion is relatively small, the legs moving slowly but quickly. At the final stage of the experiment we observe an increase in the result in the experimental group by 0.94 units constituting 4.41 points compared to the results in the control group – 3.47 points.

As previously mentioned, concretely, a better controlled breathing will become an asset during the effort, in the warm-up preparation phases, and in the recovery and stretching phases, after the physical activity. The air will expire little by little, occasionally releasing some air. The accumulation of carbon dioxide in the lungs will cause the body to try to release the air immediately, and in such a case it is necessary that the pupil be able to control himself.

Holding your breath in water while exhaling, also known as "underwater breathing" or "apnea", is a technique commonly used in diving or underwater swimming. This involves holding the breath for a period of time while exhaling slowly and controlled when the pupil is underwater, thus avoiding the risk of water inhalation.

This technique is used in order to improve physical resistance and breathing control, we observe this at the end of the experiment where in the experimental group the results are equal to 14.94 seconds, having an increase of 1.27 seconds, compared to the results in the control group - 13.67 seconds. At the same time, it is essential to practice this in a safe environment, under the supervision of a specialist, because holding the breath for a long time can lead to loss of consciousness with quite serious consequences for the pupil's body.

Inhalation is an active process, which consists of the contraction of the inspiratory muscles and results in an increase in the volume of the ribcage, holding the breath during inhaling is an essential technique used in diving, having the following benefits: improving lung capacity, increasing CO2 tolerance, relaxation and concentration, increasing balance. After the experiment, it was found that the pupils in the experimental group had a retention time of 30.23 seconds, which shows an increase of 3.76 seconds compared to the ones in the control group - 26.47 seconds.

Thus, analyzing the results of mastering the elements and the simplest swimming strokes, it was clearly demonstrated that physical education lessons using the means from the swimming test are quite effective. According to the recorded data, the pupils in the experimental group, in a relatively short time, managed to acquire a series of swimming elements and strokes without which they would not be able to learn to swim.

Thanks to the recorded results, some pupils can already enroll in different swimming sports hours, either to perform, or to increase their level of development and, why not, their motor training.

Motor training indices of 7-8 year old pupils

Physical education has a significant role in shaping and developing the personality of pupils, constituting the most important form of organizing the process of physical training and the formation of habits and motor skills, as well as the acquisition of knowledge about the given process.

At the current stage, sociocultural realities determine the need to develop innovative approaches in the design of educational systems of different types and levels. Currently, pupils' interest in physical education has decreased, time spent using modern information technologies and unlimited access to multiple social networks have replaced motor activities in the open air (dynamic games, sports competitions, etc.), this fact leads to the appearance of hypodynamia [4, 7, 10].

Early school age is the age where the foundations of the physical culture of the personality and the value attitude of the child towards education are formed, the premises for psychomotor improvement are generated. However, currently there are more and more alarming publications about the deterioration of the pupils health, reducing the level of their physical development and motor training [2, 3, 5, 11].

The analysis and generalization of the scientific and methodological literature in the field, the examination of the advanced pedagogical experience of the physical education teachers, of the swimming instructors demonstrate to us the fact that there are unused reserves in the organization of the physical education of primary school pupils to increase the level of motor training as well as to decrease the cases of morbidity [1, 6, 8, 9, 11].

Thus, one of these reserves (in the opinion of the previously mentioned authors), swimming represents the important factor, which, in the current conditions of natural and socio-economic cataclysms, becomes a vital psychomotor skill. Unlike the other sports, swimming represents a specific particularity, that it is practiced in water, an environment with a high density, which opposes a resistance in practice, greater than that of air, snow or ice. The development of the motor qualities characteristic of the swimmer is an important problem, their weight in achieving the performance is not equal, the characterization of the type of effort specific to swimming is the resistance effort with its variants resistance in the speed regime, resistance in the force regime and others.

The need to develop and implement the pedagogical technology of physical education of primary school pupils, regarding the expansion of opportunities of a developmental, cognitive, healthy and applicative nature based on the practice of swimming lessons, has become a promoting factor for updating and addressing the given problem.

The physical education lessons were organized with the implementation of the swimming means described in the table above, and at the end of the experiment, the results were subjected to pedagogical analysis in terms of developing motor qualities, representing the level of motor training of primary school pupils. The recorded results were statistically processed and presented in the form of tables and figures separately for girls and boys.

In this regard, within the school physical education with 7-8-year-old pupils from "Anatol Popovici" Primary School , Chisinau, a pedagogical experiment was organized aimed at the pupils motor training by applying the swimming means, according to an experimental plan with means from swimming.

To begin with, we will analyze the results of the motor training of the 7-8 year old girls, participating in the pedagogical experiment, all these results being presented in Table 7.

The first test that we analyzed was the 30-meter speed running, which is part of the national system for evaluating the movement speed of primary school pupils.

By systematizing the experimental research on developing speed capabilities for running 30 m of 7-8 year old schoolgirls, the following variables were identified in the study of running time. In the case of the experimental group and the control at the initial test, no significant differences are observed, $P \geq 0.05$, which speaks of the homogeneity of the groups included in the experiment for the given test.

Table 7. The level of motor skills of 7-8 year-old female pupils participating in the pedagogical experiment (girls, n = 30)

No crt.	The parameters tested		Statistical data		t	p
			Initial testing	Final testing		
			x±m	x±m		
1	30-meter speed running (s)	E	7,33±0,030	7,02±0,082	4,366	≤0,001
		C	7,61± 0,223	7,40±0,022	0,990	≥0,05
		t	1,244	4,470		
		P	≥ 0,05	≤0,001		
2	Standing long jump (cm)	E	87,33±0,223	90,07±0,596	5,310	≤0,001
		C	87,07±0,223	87,47±0,870	1,403	≥0,05
		t	0,509	2,466		
		P	≥0,05	≤0,05		
3	Seated forward bend (cm)	E	3,53±0,223	5,30±0,223	8,194	≤0,001
		C	3,2±0,223	3,6±0,149	2,094	≥0,05
		t	1,048	6,343		
		P	≥0,05	≤0,001		
4	Vertically trunk lifting from lying back position in 30” (s)	E	8,73±0,223	11,33±0,298	10,0	≤0,001
		C	8,4±0,149	8,8±0,223	2,010	≥0,05
		t	1,231	6,80		
		P	0,05	≤0,001		
5	Lying down on the gymnastic bench, push-ups (rep. no.)	E	4,73±0,149	6,8±0,298	8,214	≤0,001
		C	4,33±0,149	4,53±0,223	1,047	≥0,05
		t	1,896	6,10		
		P	≥0,05	≤0,001		

Note: n=30 t=2.048 2.763 3.674
f= 8 P≤0,05 0,01 0,001, n=15; f=14; t=2,145; 2,977 4,140 r=0,532

In the case of the final testing between these two groups, significant differences are observed, in the experimental group the weight of the results being much higher compared to the control group.

In the 30 m run, the average time obtained is equal to 7.02±0.082 s. compared to the initial testing, where the result was equal to 7.33±0.030 s, and the difference was statistically significant (P≤0.001). The sports training lessons in the experimental group were directed towards the specific development of the neuromuscular system of the lower limbs during flexion and extension, especially of the ankle and foot, which allows the dynamic amplitude of the leg kick during swimming in the front crawl and backstroke, with the active and direct participation of the muscle actions in the knee and coxofemoral movements.

There are significant differences between the results obtained by the subjects in the experimental situation in standing long jumps, this being a test of strength in the speed regime.

The application of the statistical method to the determination of jump length was continued due to the explosive force of ground bouncing associated with the swimmer's start bouncing and after the push-off from the pool edge at accelerated speed.

The results obtained by the experimental group at the end of the pedagogical experiment are of greater value compared to those of the control group.

At the initial testing, the degree of homogeneity was determined with a non-significant distribution between the experimental group and the control group (P>0.05). At the final test, the pupils demonstrated a result of 90.07±0.596 cm compared to the control group, which had an average equal to 87.47±0.870 cm.

The jump length depends on the activity of the muscle force and the qualitative control of the performance of the psychomotor movement. The applied exercises used in the pedagogical experiment had positive effects in the development of motor skills. The weight of the performances obtained by the two groups involved in the experiment, the experimental group and the control

group, in solving the objectives, significant results are found for the experimental group with a result of 90.07±0.596 cm at the final test, compared to 87.33±0.223 cm at the initial test, the difference being a statistically significant one (P≤0.001).

The next motor quality subjected to analysis was suppleness, this being a very important motor quality for that age, this being determined by Seated forward bending test.

Flexibility of the trunk, that is, joint mobility when bending forward from a sitting position, depends on anatomical changes during movement, the spine and pelvic girdle, the posterior and anterior neuromuscular system of the trunk.

The results obtained for joint mobility during Seated forward bending test determine the level of motor training for the given indicator, resulting from the experimental condition.

The obtained results demonstrate the positive behaviour on the development of motor capacities in the aspect of the modification of the joint structure of the 7-8 year old pupils from the experimental group. Sports training specific to the age of 7-8 years in swimming is dedicated to the initiation period in psychomotor development. The organization and content of the activity around which the interactions took place, gave an effect of progress in the experimental group compared to the control group, registering significant results, (5.30±0.223 corresponding to 3.60±0.149, t=6.343, P≤0.001, with 99.9% probability. There are significant differences between the results obtained in the experimental group at the initial testing - 3.53±0.223 and the final one - 5.30±0.223 cm of the experimental group "t" student criterion being 8.194 units, P≤0.001 with a probability of 99.9%. An increase in joint mobility was also observed in the control group from 3.2±0.149 cm at the initial testing to 3.6±0.149 at the end of the experiment, the result being statistically insignificant (P>0.05).

One of the very important motor qualities for any age and any sporting event is the abdominal strength, which was evaluated by Trunk lifting from lying position for 30 s.

The comparison of the results obtained by the pupils from the experimental group, which represent the level of development of the strength capacities in the speed regime, identified by the test Trunk lifting from lying back position, for 30 s, with those obtained by the ones from the control group, highlighted significant differences between the parameters obtained at the initial and final testing by the pupils of the experimental group, these being at the final testing equal to 11.33±0.298 trunk lifts, compared to 8.8±0.223 lifts at initial testing. Statistical calculations demonstrated a significant difference at the P<0.05 significance level.

Increasing the speed regime force and the amplitude of the trunk increases the frequency of the body in pupils who practice swimming through simultaneous actions of the arm force when paddling. The experimental group obtained high-performance results in the speed test at the end of the experiment, achieving higher results than the control group girls, who at the final test recorded an average equal to 8.8±0.223 trunk lifts, compared to 8.4±0.149 lifts at the initial test, the difference being statistically insignificant (>0.05).

The next motor quality under analysis is arm strength, which actually increases the efficiency of their work in the swimming test. The increase in force and the successive repetitions of paddling in the experimental group were performed at a pace close to that of the competition. Table 9 shows the results obtained by the experimental and control groups when performing lying down push-ups, hands on the gym bench.

Analyzing the initial results of the two groups involved in the experiment, we notice that they are very close in terms of values, this being also demonstrated by the statistical calculations, a statistically insignificant difference was recorded, that is, the groups were homogeneous (P>0.05), these being 4.73±0.149 push-ups in the experimental group and 4.33±0.149 push-ups in the control group.

Analyzing the final results of the pupils in the experimental group and the control group, we observe a significant increase only in the experimental group, who at the end of the experiment recorded an average of 6.8±0.298 push-ups (P<0.05), compared to 4.53±0.223 push-ups in the control group, where the increase in results compared to the initial testing was statistically insignificant (P>0.05).

During the experiment, organizational measures were taken by establishing appropriate forms on stages and durations of the training cycle in the gym and pool. At the same time, methodological measures were taken, through the use of efficient means of maximum functionality, introducing questioning elements to allow the support of the dynamism of the activity with current evaluation of the quality of individual and collective achievements, in the experimental group.

Next, we will analyze the results of motor training of 7-8 year old pupils (boys) by using the swimming means in school physical education (Table 8).

Table 8. The level of motor skills of 7-8 year-old pupils participating in the pedagogical experiment (boys, n = 30).

No. crt.	The parameters tested		Statistical data		t	p
			Initial testing	Final testing		
			x±m	x±m		
1	30-meter speed running (s)	E	7,28±0,044	6,34±0,298	2,671	≤0,05
		C	7,29±0,037	7,21±0,086	1,067	≥0,05
		t	0,175	2,88		
		P	≥0,05	≤0,05		
2	Standing long jump (cm)	E	93,27±0,298	98,93±0,298	19,653	≤0,001
		C	93,13±0,298	94,0±0,521	1,968	≥0,05
		t	0,333	8,272		
		P	≥0,05	≤0,001		
3	Seated forward bend (cm)	E	2,60±1,149	4,67±0,149	14,375	≤0,001
		C	2,20±0,864	3,13±0,149	1,094	≥0,05
		t	0,456	7,298		
		P	≥0,05	≤0,001		
4	Vertically trunk lifting from lying back position in 30” (s)	E	8,73±0,149	13,47±0,298	18,73	≤0,001
		C	8,87±0,149	9,47±0,372	1,881	≥0,05
		t	0,664	8,492		
		P	≥0,05	≤0,001		
5	Lying down on the gymnastic bench, push-ups (rep. no.)	E	4,33±0,223	8,2±0,223	3,90	≤0,01
		C	4,0±0,149	4,4±0,196	2,325	≤0,05
		t	0,268	3,56		
		P	≥0,05	≤0,01		

In the physical education lessons with 7-8 year old pupils, there were used categories of basic motor qualities, such as speed, strength, mobility and flexibility, execution resistance, all of which are very important for increasing the level of physical training, physical and harmonious development of the pupils.

Thus, table 10 shows the results obtained by the pupils in the speed test, the 30-meter run. Following their analysis, it was found that during the initial testing the results of the two groups involved in the pedagogical experiment were relatively equal, a fact that indicates the homogeneity of the groups involved in the experiment. Thus, at the initial testing, the experimental group recorded an average of 7.28±0.044 seconds, and the control group - 7.29±0.037 seconds, and statistical calculations demonstrated a statistically insignificant difference ($P>0.05$).

The final results differ quite a lot in the two groups included in the pedagogical experiment, where the experimental group demonstrated an average of 6.34±0.298 seconds, and the control group - 7.21±0.086 seconds. The statistical calculations registered significant differences only in the experimental group ($P<0.05$), which demonstrate the effectiveness of the pedagogical experiment organized with the pupils in the experimental group.

The force test in speed regime, represented by the standing long jump, had an almost identical evolution to that of the speed quality, where at the initial testing the control and experimental groups registered approximately equal results in terms of values.

Thus, at the initial testing, the experimental group recorded a result equal to 93.27±0.298 centimeters, and the control group 93.13±0.298 centimeters, visibly they are very close. At the final test, a significant increase was registered in the experimental group, the final result being equal to

98.93±0.298 centimeters, which is a statistically significant increase ($P<0.05$). The results obtained demonstrate the value of the "regime" force depending on the weight of other motor qualities with which it is combined.

The next test subjected to research was that of joints mobility, being analyzed by the Seated forward bend test. In fact, mobility represents the quality of the musculo-ligaments and joints system that allows the performance of large-amplitude movements.

Seated forward bend represents "suppleness" and is closely correlated with joint mobility, such as elasticity, relaxation capacity, neuro-muscular coordination.

At the initial testing, the difference in the results between both experimental groups is not significant ($P>0.05$), and this indicates the homogeneity of the groups for this indicator. Significant results are observed at the final test, where the pupils of the experimental group demonstrated a result of 4.67±0.149 cm, the control group – 3.13±0.149 cm. According to statistical calculations, a significant increase was registered only in the case of the experimental group ($P<0.001$).

According to the specialized literature, the age of 7-8 years is quite favorable for the development of suppleness, it is precisely in the sensitive period for the development of this quality, and a specific training with well-selected and correctly applied means can bring quite good results regarding the development of suppleness in 7-8-year-old pupils.

The next test was to demonstrate the effectiveness of the developing combined motor quality, such as the speed regime force represented by Trunk lifting from lying back position in 30 sec.

Training pupils for force-speed requires the harmonious strengthening of all muscle groups of the locomotor apparatus and the trunk force ratio in a limited time.

Significant results were obtained by the pupils of the experimental group at the end of the pedagogical experiment, demonstrating a result of 13.47±0.298 repetitions for 30 s, compared to those of the control group with a result of 9.47±0.372 repetitions for 30 s. The 7-8 year old pupils of the experimental group improved the result of trunk lifting by 4.74 repetitions for 30 s with a certain chain action force with well-determined cyclic movements.

The last test to assess the level of development of the motor skills of 7-8 year old pupils was to assess the muscle strength of the pupils' arms.

The organization of sports training in our research involved the application of specific methodical procedures aimed at achieving the optimal parameters of the effort with the effective use of the means of developing motor capacities. The results obtained on the parameters of the arm force capacities when performing push-ups from lying down position, hands on the gym bench found the effectiveness of the methodology applied in accordance with the age and individual characteristics of the 7-8 year old pupils who practice swimming.

The homogeneity of the experimental groups at the initial testing shows us the lack of difference between the results obtained when performing push-ups. The experimental group obtained an average of 4.33±0.223 repetitions, the control group 4.0±0.268, ($P\geq0.05$). As a result of applying the means of swimming, accessible to the age, the pupils of the experimental group obtained a result of 8.2±0.223 push-ups, at the end of the experiment, compared to the control group 44±0.196 repetitions, with a difference of 3.8 repetitions. The data obtained are statistically significant in both groups ($P<0.05$), but with a greater weight in the experimental group.

Thus, the swimmers of the experimental group demonstrated a positive behavior in using the maximum possibilities in the development of arm force capacities by increasing the number of push-ups from 4.33±0.223 push-ups, the initial test, to an average of 8.2±0.223 push-ups, the results being statistically significant ($P<0.05$).

Analyzing the results of the motor training of the pupils included in the pedagogical experiment, it was quite clearly demonstrated that both girls and boys involved in the research can achieve motor performance using effective methodologies in this regard, and one of them is the application of swimming means in the physical education process of primary school pupils.

GENERAL CONCLUSIONS AND RECOMMENDATIONS

There were formulated the following conclusions following the organization and conduct of scientific research with primary school pupils by applying the swimming means in school physical education:

1. The analysis of specialized literature highlighted the fact that there are currently a number of methodologies for increasing the level of pupils' motor training, including at the level of primary education. However, very few works address the importance and effectiveness of applying the swimming means to increase the different age pupils motor skills and especially at the primary level.
2. Early school age is a very favorable period for acquiring new movements. Approximately 90% of the total volume of motor skills acquired throughout a person's life are acquired between the ages of 6 and 12. For these reasons, learning a large number of new and varied movements is the main requirement for the content of children physical training.
3. Numerous studies have shown that the age of 7-8 years fits perfectly into the sensitive periods of development of motor capacities, in which a focused intervention has a positive effect on the child's motor skills and physical development. If these periods are not used to obtain optimal results, all the possibilities of the body will not be utilized or a longer time will be required to achieve them.
4. According to the results of the ascertaining stage of the experiment, it was found that in most cases the basic motor skills of primary school pupils are not sufficiently well developed. Motor skills can be developed with the help of specially designed complexes of psychomotor techniques, which can be successfully applied in physical education lessons [137, p.71-74].
5. Since one of the objectives of the experimental study also aims to identify the interests and needs of primary school pupils regarding the practice of physical exercise, the survey method was used: conversations with children and questionnaires of parents. Out of the total number of respondents, only 36% of parents plan to enroll their children to the teaching and training group in order to improve sports results; 39% are not interested in in-depth training; another 25% have not made a decision about their child's swimming future. During the analysis of the obtained data, we found that the teaching staff must create special conditions to motivate parents and pupils to practice swimming, as it is an event with multiple physical and health benefits.
6. The data of the comparative analysis of the level indices results of acquiring the basic technical elements and procedures from swimming, recorded by pupils from the control (CG) and experiment (EG) groups at the final stage of the pedagogical experiment can be represented by the following findings.

- Following the pedagogical experiment, the results of the experimental group increased significantly compared to the results of the control group, which confirms the effectiveness of the proposed experimental methodology.
- The most highlighted final results of mastering the swimming elements in the experimental group were in the "Board" tests, where an increase of 3.13% was recorded at the end of the experiment, in the "Star on the chest" test - 4.33%, "Star on the back" - 3.48% and "Slipping through the water" - 3.80%, these actually being the most important for learning one or another style of swimming.
- Speaking of such elements as "Leg Crawl with hands on a board ", Breath holding" in inhalation and exhalation, the increases were not as obvious as in the previous cases, but they can only be acquired over time. The increases in results in the experimental group in the given case were on average 1-1.27%, which represent a relatively good increase for the period of the pedagogical experiment.

7. The experimental program, focused on the use of the swimming means in school physical education with primary school pupils, was quite effective with reference to the development of the pupils' basic motor qualities, given the fact that the 7-8 years old period fits perfectly into the sensitive periods of developing several motor qualities, both in boys and in girls.
8. According to the results of the formative experiment, both boys and girls essentially improved their indices related to the development of suppleness at the end of the pedagogical experiment, where the girls recorded a result equal to +5.30±0.223 cm, and the boys - +4.67±0.149 centimeters.

In fact, this indicator fits perfectly into the sensitive period for 7-8 years old boys and girls, a fact that led to a significant increase at the end of the experiment.

9. A significant increase in the results at the end of the pedagogical experiment was also recorded in the case of tests of general force and speed regime force, expressed by the test " Vertically trunk lifting from lying back position in 30 sec." and " Standing long jump ", where the girls at the end of the experiment recorded results equal to 11.33±0.298 trunk lifts and 90.07±0.596 cm at standing long jump, in both cases the increases were statistically significant compared to initial results ($P<0.001$).

10. A less significant increase in the final results of the pedagogical experiment related to motor skills was registered in the speed test, even if the increases at the end of the pedagogical experiment were statistically significant ($P<0.001$). It should be noted that according to the theory and practice of physical education, the motor quality Speed is a rather conservative quality and develops rather slowly and requires more time.

Thus, it was solved **The important scientific problem in the field,** which resides in the low level of motor training of primary school pupils, the lack or insufficient number of guides and promo materials related to optimizing the physical education of primary school pupils through the use of various means, including those from swimming.

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There were formulated the following practical-methodical recommendations following the pedagogical research conducted with 7-8 year old pupils, using on a large scale the swimming means in school physical education:

- In accordance with the data from the specialized literature, we can appreciate that the development of the motor capacity of the pupils through swimming means, brings beneficial effects also on the behavior of the pupils and the management of their emotional state.
- Physical education lessons with the application of swimming means must be done strictly under the supervision of a specialist in the field.
- Swimming lessons should take place in a safe and well-designed environment that attracts the attention of the pupils.
- Swimming lessons must take place systematically, at least 2-3 times a week.
- Lessons will start with short swimming sessions and gradually increase the duration and complexity of physical tasks.
- At a young school age, as many and various movements as possible will be acquired, so that in the future as many complex techniques of sports swimming as possible will be mastered, but due to the instability of attention this must be maintained by the clear explanatory method and visual demonstration.
- In order to more effectively develop motor skills in pupils, modern techniques and methodologies must be applied, complex exercises and special psychomotor tests.
- For a better assimilation of movements in the water, it is recommended to use special equipment, which considerably facilitates the execution of movements in the aquatic environment, such as boards, fins, tubes, palms and others.
- It is recommended to use during swimming lessons various water games with colorful equipment that attract the attention of even pupils who are afraid of water and get involved in the game without thinking, thus successfully assimilating movement in water.

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ANNOTATION

Ninicu Alina „Motor Preparation of Primary School Students through Swimming Techniques”: Doctoral Thesis in Education Sciences. Chișinău, 2025.

Structure of the Thesis: the thesis includes introduction, three chapters, general conclusions, and recommendations. It also comprises the bibliography with 206 references, 126 pages of main text, 5 appendices, 17 figures, and 37 tables. The results of the research have been published in 8 scientific works.

Keywords: motor preparation, students, primary school level, swimming, motor skills, physical education.

Aim of the research: the research aims to investigate the efficiency of applying swimming techniques in physical education for primary school students.

Objectives of the research: 1. To study the conceptual framework for motor preparation of young school-age students through swimming techniques. 2. To evaluate the level of motor preparation among primary school students. 3. To develop the content of an experimental program for motor preparation of primary school students using swimming techniques. 4. To provide the theoretical foundation and design a pedagogical model for motor preparation of primary school students using swimming techniques. 5. To experimentally validate the efficiency of implementing the pedagogical model and the experimental program for motor preparation of young school-age students using swimming techniques.

Scientific novelty and originality: the scientific novelty and originality lie in the development and theoretical and experimental validation of the core concept of motor preparation for young school-age students. Specifically, this involves the creation and practical implementation of a pedagogical model and an experimental program based on swimming techniques.

Significant scientific problem addressed: the research addresses an important scientific problem, namely the low level of motor preparation among primary school students. This issue consists of the lack or insufficient availability of guides and promotional materials aimed at optimizing physical education for primary school students using diverse techniques, including those derived from swimming.

Theoretical significance: the theoretical significance results from the clarification of theoretical and practical foundations for motor preparation of students aged 7–10 through swimming techniques. Furthermore, it includes the consolidation and scientific justification of the pedagogical model and experimental program, as well as the development of pedagogical technology for motor preparation based on swimming techniques.

Practical value of the research: the practical value consists in the presentation and validation of a set of pedagogical tools and theoretical-practical foundations reflected in the components of the pedagogical model and experimental program for motor preparation of primary school students using swimming techniques. As a result, the findings can be successfully applied by school teachers working with primary school students. Moreover, they are valuable for the professional training of students in higher education institutions specializing in physical education and sports.

Implementation of scientific results: the results were implemented within the physical education process for primary school students at Theoretical High School No. 12, „Anatol Popovici” in Chișinău. Specifically, two groups (a control group and an experimental group) consisting of students aged 7–8 were involved. In addition, these results were applied within the professional training process at the Department of Continuing Professional Development at the State University of Physical Education and Sports. This implementation served both to assess the current state of the researched topic and validate the pedagogical model and experimental program for motor preparation of primary school students using swimming techniques.

ADNOTARE

Ninicu Alina „Pregătirea motrice a elevilor din treapta primară prin mijloacele înotului”: Teză de doctor în științe ale educației. Chișinău, 2025.

Structura tezei: introducere, 3 capitole, concluzii generale și recomandări, bibliografie (206 surse), 126 pagini text de bază, 5 anexe, 17 figuri, 37 tabele. Rezultatele obținute sunt publicate în 8 lucrări științifice.

Cuvinte-cheie: pregătire motrice, elevi, treapta primară, înot, calități motrice, educație fizică.

Scopul cercetării constă în cercetarea eficienței aplicării mijloacelor din natație în cadrul educației fizice cu elevii din treapta primară.

Obiectivele cercetării: 1. Studierea reperelor conceptuale ale pregătirii motrice a elevilor de vârstă școlară mica prin mijloacele înotului. 2. Aprecierea nivelului pregătirii motrice a elevilor din clasele primare. 3. Elaborarea conținutului programului experimental de pregătire motrice a elevilor din treapta primară prin aplicarea mijloacelor din înot. 4. Fundamentarea teoretică și elaborarea modelului pedagogic de pregătire motrice a elevilor din treapta primară prin mijloacele din înot. 5.Validarea experimentală a eficienței implementării modelului pedagogic și a programului experimental de pregătire motrice a elevilor de vârsta școlară mica prin mijloacele înotului.

Noutatea și originalitatea științifică constă în elaborarea și validarea teoretică și experimentală a conceptului de bază ce ține de pregătirea motrice a elevilor de vârstă școlară mică prin elaborarea și implementarea în practică a modelului pedagogic și a programului experimental axat pe mijloacele preluate din proba de natație.

Problema științifică importantă soluționată în domeniu rezidă din nivelul scăzut al pregătirii motrice a elevilor din treapta primară, lipsa, sau numărul insuficient de ghiduri și materiale promoționale ce țin de optimizarea educației fizice a elevilor din treapta primară prin folosirea diverselor mijloace, inclusiv și a celor din proba de înot.

Semnificația teoretică rezidă din precizarea fundamentelor teoretico-aplicative a pregătirii motrice la elevii de 7-10 ani prin mijloacele înotului, din consolidarea și argumentarea științifică a *modelului pedagogic și a programului experimental,* prin elaborarea tehnologiei pedagogice privind pregătirea motrice prin aplicarea mijloacelor preluate din natație.

Valoarea aplicativă a lucrării constă în expunerea și validarea ansamblului de instrumente pedagogice și fundamente teoretico-aplicative, reflectate în componentele modelului pedagogic și a programului experimental de pregătire motrice a elevilor din treapta primară prin aplicarea mijloacele din natație. Rezultatele cercetărilor în cauză pot fi aplicate cu succes de către profesorii școlari ce activează cu elevii din clasele primare, precum și în cadrul pregătirii profesionale a studenților din instituțiile de învățământ superior de educație fizică și sport.

Implementarea rezultatelor științifice. Rezultatele obținute au fost implementate în cadrul procesului de instruire a elevilor din treapta primară la disciplina „educației fizică” în cadrul Școlii generale nr. 12, „Anatol Popovici” din Chișinău pe două grupe (grupa martor și grupa experimentală), grupele fiind constituite din elevi de vârsta 7-8 ani, precum și în cadrul procesului formativ a departamentului de formare profesională continuă din cadrul Universității de Stat de Educație Fizică și Sport, în scopul determinării situației la tema cercetată, dar și prin validarea *modelului pedagogic și a programului experimental de pregătire motrice a elevilor din treapta primară prin mijloacele înotului.*

NINICU Alina

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