



AQUA SYSTEM – EFFICIENT METHOD OF DEVELOPING THE PHYSICAL EDUCATION CLASSES FOR GIRL STUDENTS

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Abstract

Purpose: The purpose of the paper in question is to prove the efficiency of the Aqua System for the physical education classes to what girl students are concerned.

Methods: The main research method represented the longitudinal pedagogical experiment.

Results: After the final tests there was significant differences between experimental and control groups regarding: speed develop, abdominal strength, biceps and triceps strength and explosive strength.

Conclusion: The physiological advantages are due to the simultaneous combination of all the Fitness components: the Cardio Resistance and the Innervations with new programs, in this way diversifying the traditional methods of practice and proposing a “least boring” and highly entertaining, dynamic and attractive activity.

Key words: aqua system, physical education class, girl students.

Introduction

The past years, water gymnastics has earned an increased importance, mostly because the “pool” phenomenon is now part of the common baggage of experiences shared by a large number of people who are used to practicing a sporting activity both at an amatory level and a therapeutic one. It is common knowledge that the current way of working is constantly compelling people to choose different habits and positions that are not so adequate from the physical health point of view. Furthermore, for many people, it is absolutely necessary to empty the tensions accumulated during the day through physical exercises (C. Horve-Willoughby, 2003). Basically it was an outdoor activity which allowed this type of physical and mental advantage; afterwards appeared the increasing number of gyms with the most various types of activities starting from body building and up to fitness in its most various combinations. Presently, to all of these activities one has added the ones that were always there but which have made a comeback along with fashion, such as riding the bike, even a mountain bike in a simple race on the field or in the woods (A.S.D FITEDUCATION). Among all of these activities, the pool has always been a source of “swimming initiation”, and for a lot of years to come, besides swimming and diving, few things have been learned in it. The equipment development, the competition between fitness gyms, the mass-media and publicity, in general, from the numerous magazines showing science fictional images undergone in water, have “compelled” the pool world to add to the common activities the ones that in the beginning have been “reserved” to the rehabilitation and esthetic centers, holiday

campuses, such as water gymnastics with its various ramifications, hydro kinetic therapy, the activities perambulator to birth, the recovery of the handicapped people. Even though it is extremely difficult to evaluate the technical and quantitative value, from the physiological point of view, and to make comparisons with the effectuated activities on land, to what the operations and work hours are concerned, it is obvious that the movement in water can offer a lot of benefits to those that practice it, as long as the trainer or instructor is highly qualified and ready to unveil correctly and with enthusiasm what he has in mind. There are a lot of similarities between the various activities done on land and those done in the water, but the duration and especially the way of execution can be very different. For these reasons alone an instructor must know, both theoretically and practically, which are the effects a certain activity may generate and what methods he can take in account to make the training class as practical, useful and fun as possible. In order to do a good job in this activity the knowledge of certain theoretical and practical aspects of the sea world becomes indispensable (K. Katz, 1981). Presently, in the sea world, one can identify three types of activities (Aquatic Exercise Association. 2006):

1. water gymnastics with a sporting and strengthening purpose;
2. activity in the water related to fitness and other choreographically activities;
3. functional recovery – rehabilitation

In any of the activities mentioned above the characteristics generated by the water resistance and the movement inside the middle of the liquid will always remain constant (A. Luca, 2001).



These are characterized by a delicate but constant resistance of water, which, on one hand allows a continuous and efficient activity for improving the muscular tonus and on the other hand does not allow the appearance of hypertrophy, a certain effect which is not always wanted by the water users.

The premises of the research

Aqua system is based on the concept of training treating simultaneously all of the Fitness components in the water: the Cardio Vascular Resistance and the Muscular Innervations. The objective for this method is giving theoretical and practical support to the professionals who want to develop their activities within the "Aqua Fitness" world. The workshop provides efficient combined training: Innervations exercises with Cardio Vascular ones, all distributed in a dynamic and complete training session (A.S.D FITEDUCATION, J. Mason, 1999). The latter may offer:

- a global activity combining trainings
- more motivating and fun lessons creating a new, innovative method

The **purpose** of this paper states the role of the man's physical qualities as essential in improving the organism's qualities and, implicitly, in fighting stress and daily issues. The paper in question aims to develop a study regarding the acquisition of certain better physical qualities even from the beginning of practicing the Aqua System exercises. This has become really important, especially in developed countries, where the method has proved to be beneficial, simply due to its efficiency and non agonizing aspects.

Hypothesis: one begins from the premise that through Aqua System, in a single session one can obtain remarkable physiological benefits "combining" simultaneously all of the Fitness components: the Cardio Resistance and Innervations with new programs, diversifying the traditional training methods and proposing a "least boring" activity that is a dynamic, ecstatic and fun one.

Methods used

Apparatuses and objects used

Talking about apparatuses, one can refer to different types and models. One can define and divided them as follows: resistant, floating and mixed. The apparatuses have different degrees of

difficulty and different execution speeds (J.D. MAC. DOUGAL, & COL).

The main apparatuses used in aqua-fitness are: the pool's edge, palm shaped gloves, floating belts, hydro protective ankles, pole, swimming fins, rubber bands, scissors, hydro step, aqua flap, water bikes. To all of these one can add (with a certain reduced using) the equipment of the swimming school: fins, disks, floats, life buoys, ball.

Aqua System Means

Cardio Aqua: consists of a series of general exercises of about 25-35 minutes followed by muscular resistance exercises executed especially for the superior and inferior extremities (A. Kock, T. Dargatz, 1995). This program offers the possibility of achieving a general conditioning effect. The resistance activity must be balanced and dynamic executing a single exercise for each muscular group, eventually modifying only the execution speed and the force application (table 1 and 2).

Water gymnastics: represents the traditional water gymnastics lesson, developed with or without music and especially addressed to a feminine target (easy aqua gym for third age women, pregnant women, as well as animating the organism, etc.) and has the following characteristics: music is not indispensable, does not have physical counter indications, can be done both in deep and shallow water, can be done with or without auxiliary equipment, can integrate the athletic training in different sports, the muscular strengthening is one of its many functions (E. McEvoy, P. Josep, 1985)

Water Aerobic: refers to all water activities done on music which aim not only to improve the general innervations and coordination capacities but also to act on the respiratory capacities of each individual with increasing respiratory performance through an adequate training. Among the water aerobic objectives one may find (D. Ott, N. Shmidt, 1995):

- stimulating the cardio respiratory apparatus
- improving the coordination capacities
- using the systems of producing respiratory energy
- using choreographies and movement combinations (with or without equipment) on music

Table 1

Classical Fitness moves used in the lessons with girl students in the sea world

REDUCED IMPACT:	GREAT IMPACT:	DANCING STEPS
<ul style="list-style-type: none"> • Walking • March • Touching the foot • Touching the toes • Extensions • Feints • Leaning on the heel • Lifting up the knees • LEG CURL • Kicking forwards, on the side and backwards • Dwarf walking • V steps • Ext-Ext –In-In 	<ul style="list-style-type: none"> • Jogging/Running • Jumping (and while sitting) • Feints • Lifting up the knees • Leaning forwards • Leaning backwards • Jumping while lifting up the heels • Kicking • Kicking whit your foot up • Jumping while joining the heels • Tail slide • Swinging on the side • Jumping whit your foot on the side 	<ul style="list-style-type: none"> • MAMBO • CHA CHA • SWIVELLING • CHASSE' • JAZZ SQUARE • KICK BOWL CHANGE • PAS DE BOURREE • PONY • TWIST

Table 2

The basic steps of water aerobic gymnastics and the sea rhythms used in the girl students lessons

LOW IMPACT STEPS	GREAT IMPACT STEPS
<ul style="list-style-type: none"> • Walking • Touching the toes • Knees to the chest • Hitting/Kicking • Running with the heels to the bottom • Leaning forwards while touching the leg • Dwarf walking forwards/backwards • Coiling the torso • Jumping like a ball 	<ul style="list-style-type: none"> • Crossed steps • Lifting up the knees • Kicking (high or low) • Jumping (and while sitting) • Jumping while sitting with crossed ankles • Airy crane • Jumping whit your feet on the side • Riding position • Tail slide • Scissors • Skiing • Curling position • Butterfly walk

Continuous water activity

The choreographic water activities are numerous and aim different aspects of the gymnastic movement in the water. It is difficult to establish for each of them a correct way of name identification because, in this case, the free interpreting of the instructors has generated a diversity of programs around a certain name (R. Sova, 2000). This is the reason, just to simplify and draw an important pilot line, for which all of these

activities have united under the general term of aqua gym, the activities in question following the musical rhythm, creating a succession of gymnastic movements on land and in the water, with or without equipment. All of these combined generate a certain choreography. Therefore, "Water aerobic gymnastics" or Aqua Gym is a conventional name for identifying the type of water activity, but any type of water gymnastics can be named aerobic (WWW.FITEDUCATION.IT) (table 3).

Table 3

Elements and exercises used

Articulate movements	Low intensity	Medium intensity	High intensity	Combinations
<ul style="list-style-type: none"> • Head • Shoulders • Pelvis • Knees • Ankles 	<ul style="list-style-type: none"> • Walking • Side curling • Tail slide • Leaning on the heels • Feints • Squat • Curling • Running with the knees to the chest 	<ul style="list-style-type: none"> • Frontal low kick • Side low kick • Tail slide • Leaning on the heels • Jumping pace • Scissors • Jumping with a curl 	<ul style="list-style-type: none"> • Frontal high kick • Side high kick • Tall scissors • Crane • Riding position • Jumping: with the legs glued/departed/side to side/forwards/backwards • Floating crane 	<ul style="list-style-type: none"> 8t Crane 8t High kick 16t Jumping with curl Repeat everything SX

Organizing and developing the research

The research has been conducted within the physical education classes with the girl students of the Transylvania University, during one semester (14 weeks x 60 minutes). The girls chose from a list of 11 educational activities swimming. The sample included 20 girl students (10 gathering the experiment group, 10 the control group). The main research method represented the longitudinal pedagogical experiment. The experiment group developed lessons of Aqua System Fitness while the control group developed normal swimming lessons. We have organized 2 testing parts at the beginning and end of the semester. The testing consisted of 4 attempts:

1. speed running in the water on a 10 meters distance
2. maintaining the legs at 90° to the trellis form hanging
3. push ups on the clock – number of repetitions in 20 seconds
4. 5 jumps with the knees to the chest in the water on the clock

To the initial testing of the first attempt - **speed running in the water on a 10 meters distance** – the average scores of the experimental group varied from 8, 87+/- 0, 09s, with a 0, 29 miscalculation, while the control group varied from 8, 78+/-0, 09s, with a 0, 29 repeat miscalculation. The Student testing value for the initial testing was of 0, 68 which proves that between the two groups, in the beginning of the experiment, there weren't considerable differences for a significance step of P>0, 05 (table 4). To the final testing the average scores for the experimental group varied from 8, 23+/- 0, 06s, with a 0, 19 repeat

miscalculation, while the control group varied from 8, 68+/- 0, 08s, with a 0, 25 repeat miscalculation. The Student testing value for the final testing was of 4, 34 which proves that at the end of the experiment there were considerable differences between the two groups for a significance step of 99% for P<0, 01. Considering the initial testing, the values of the experimental group improved with 0, 8s while the values of the control group improved with only 0, 1s (table5).

Obtained results

To the initial testing of the second attempt - **maintaining the legs at 90° to the trellis form hanging** – the average score of the experimental group varied from 4, 05+/-0, 05s, with a 0, 16 repeat miscalculation, while the control group varied from 4,0+/-0, 03s, with a 0, 1s repeat miscalculation. The Student testing value was of 0, 77 which proves there weren't considerable differences between the two groups in the beginning of the experiment, congruent to a significance step of P>0, 05. To the final testing the average scores for the experimental group varied from 4, 31+/-0, 02, with a 0, 08 repeat miscalculation, while the control group varied from 4, 10+/-0, 02s, with a 0, 09 repeat miscalculation. The Student testing value for the final testing was of 5, 63 which proves that at the end of the experiment there were considerable differences between the two groups for a significance step of 99% for P<0, 001. Considering the initial testing, the values of the experimental group improved with 0, 26s while the values of the control group improved with only 0,10s (tables 4 and 5).

Table 4

Statistical indicators for the TI general physical education training attempts – girl students (10)

Nr.	Parameters	Initial testing/girl students n=10			
		Experiment group	Control group	Authenticity	
		\bar{X}	\bar{X}	t	p
1.	Speed running in the water on a 10 meters distance. (sec.)	8,87 ± 0,09	8,78 ± 0,09	0,68	>0,05
2	Abdominal isometric contraction from hanging to the trellis (sec.)	4,05 ± 0,05	4,00 ± 0,03	0,77	>0,05
3	Push ups (number of repetitions/20 sec.)	10,2 ± 0,41	10,1 ± 0,51	0,15	>0,05
4	5 jumps with the knees to the chest on the clock (sec.)	7,03 ± 0,06	7,08 ± 0,07	0,52	>0,05

Table 5

Statistical indicators for the TF general physical education training – girl students (n.10)

Nr.	Parameters	Final testing/girl students n=10			
		Experiment group	Control group	Authenticity	
		\bar{X}	\bar{X}	t	p
1.	Speed running in the water on a 10 meters distance. (sec.)	8,23 ± 0,06	8,68 ± 0,08	4,34	<0,01
2	Abdominal isometric contraction from hanging to the trellis (sec.)	4,31 ± 0,02	4,10 ± 0,02	5,63	<0,001
3	Push ups (number of repetitions/20 sec.)	13,6 ± 0,30	11 ± 0,30	5,98	<0,001



4	5 jumps with the knees to the chest on the clock (sec.)	6,34 ± 0,01	7,03 ± 0,06	10,3	<0,001
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To the initial testing of the third attempt - **push ups on the clock – number of repetitions in 20 seconds** – the average score of the experimental group varied from 10, 2+/-0, 41s, with a 0, 29 repeat miscalculation, while the control group varied from 10,10+/-0, 51s, with a 1,62 repeat miscalculation. The Student testing value was of 0, 15 which proves there weren't considerable differences between the two groups in the beginning of the experiment, congruent to a significance step of $P > 0, 05$. To the final testing the average scores for the experimental group varied from 13, 6+/-0, 30, with a 0, 97 repeat miscalculation, while the control group varied from 11+/-0, 30s, with a 0, 97 repeat miscalculation. The Student testing value for the final testing was of 5, 98 which proves that at the end of the experiment there were considerable differences between the two groups for a significance step of 99% for $P < 0, 001$. Considering the initial and final testing, the values of the experimental group made a progress of 3, 4 s, while the control group only a 1s progress (tables 4 and 5). To the initial testing of the fourth attempt - **5 jumps with the knees to the chest in the water on the clock** – the average score of the experimental group varied from 7, 03+/-0, 06s, with a 0, 21s repeat miscalculation, while the control group varied from 7, 84+/-0, 07s, with a 0, 22s repeat miscalculation. The Student testing value was of 0, 15 which proves there weren't considerable differences between the two groups in the beginning of the experiment, congruent to a significance step of $P > 0, 05$. To the final testing the average scores for the experimental group varied from 6, 43+/-0, 01s, with a 0, 05s repeat miscalculation, while the control group varied from 7, 03s, with a 0, 2s repeat miscalculation. The Student testing value for the final testing was of 10, 3 which proves that at the end of the experiment there were considerable differences between the two groups for a significance step of 99% for $P < 0, 001$. Considering the initial testing, the values of the experimental group improved with 0, 27s while the values of the control group improved with only 0, 05s (tables 4 and 5).

Conclusions

Advantages and benefits of water fitness:

- Water movement can result in an efficient relaxation of the spine and various articulations, innervating the tendons, the ligaments and the muscles avoiding the risk of overcharging the muscles or traumatizing the various articulate apparatuses
- Water movement can result in the innervations of the muscularity without provoking hypertrophy
- Opposing a much bigger resistance to going further than that of air, water will allow the harmonious, balanced and significant use of the entire muscularity of calf and torso with the respective improvement of the efficient cardio vascular apparatus

- Compelled to reorganize and adapt the driven schemes to water, every exercise that is being done in the water will improve the receptive sensibility and balance
- In the water one can correct the position flaws
- There are no same tiring symptoms with that of the land activities
- One does not accumulate lactic acid
- In the water one can maintain longer the body temperature
- The training effects will be much more faster than those on land
- The water's continuous massage will lead to an improvement of the blood and lymphatic circulation with the drained respective effect
- The psycho driven abilities create a sensation of control and personal satisfaction produced by the training and improving the kinesthetic and aquatic knowledge
- The psycho physical abilities relate to the good physical sensation induced by the movement in the water and generate a mentally well being and relaxation.

The negative aspects of the water activities

- To a water temperature below 28°, the vascular constriction will appear with a possible cold sensation
- The variety of movements and choreographies induced by water are limited to what those effectuated on land are concerned
- In the water one will have a greater difficulty in executing the correct moves (the greatest challenge will be in deep water).

Fundamental parameters of water gymnastics

We are talking about the ones that we consider being important and accountable with the purpose of developing a certain activity that leads to obtaining the provided results, without taking any chances to what the incorrect execution of some students is concerned, situation which might compromise the validity of the provided exercises.

We are taking in account the following:

- Positioning, that is the correct position adapted to the developing of the exercises
- The water's depth, depending on which we can modify the pupils' arrangement in the pool
- The water temperature, a fundamental factor in the rehabilitation sector, as well as in the Fitness frame
- The type of movement, the direction and the richness of the latter, as well as the execution speed, subordinated, more or less to a musical rhythm.



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