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A FEW METHODS TO TEST THE SPECIFIC LEVEL OF THE PHYSICAL TRAINING OF THE NAVAL STUDENTS ACCORDING TO THE PROFESSIONAL REQUESTS ABOARD SHIPS

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SUMMARY: *This paper presents only some of the research methods and the results of some scientific experimental investigations made on naval students and a group of the navigating personnel, concerning the necessary level of their physical specific training in accordance with the requests and professional needs aboard maritime ships. The scientific strictness of the applied research methods is demonstrated here by the absolutely impartial results we obtained. The final conclusion of our research is the need that the whole training process of the naval students to be oriented towards to that forms and ways which can imitate the requests and the specific involvement in the life aboard ships, during the best weather conditions and tempest on the sea as well.*

Key words: *Specific physical training, statistic- mathematical processing, the rope pulling, rowing, applied swimming, dressed swimming, applied itinerary, etc.*

INTRODUCTION

As a general point of view, the navigation as well as the process of the specific professional training of the navigators represents an important scientific study and research domain of greatest interest and attractivity. In our over 30 years of professional experience in the area (superior educational activity in the Navy), we tried hard to bring in a substantial contribution in the field of perfectioning the didactical forms and ways to act in order to create real naval officers able to reach the highest professional levels, in order to develop a specific professional action and successfully cope with the difficulties and the

bad weather conditions this job is supposed to face at any moment.¹

THE RESEARCH METHODS

They have been very many of them. Some of them have been assumed from other works of the specific scientific literature. Some others, most of them, bear the seal of the specific domain we use to study: the superior naval education in the activities in the Navy. Missing the necessary room, we'll present here only two of the research methods.

I. THE STATISTIC- MATHEMATICAL INVESTIGATION

¹ We mention the contribution in achieving this work of mr. col. (rs.) psiholog **Dan NICOLAU**

METHOD, THE ANALYZING METHOD, THE DATA PROCESSING AND INTERPRETATION

During our *objectivation* of the research, we used the statistic-mathematical methods. We had the opportunity to notice, to compare to do statistical processing in order to state very precisely that the positive influence noticed at the experimental group level, compared to that of the witness group, was not hazard but the effectiveness of the scientific improving intervention on that group.

During *the rationalizing* process of the research methods, we selected, from that lot of possibilities to process and interpret, generally offered by the mathematical statistics, only those closest procedures that answer best to our research tasks. We present here some statistical methods together with the statistic-mathematical formulas used to reach the goal of our research.

A. The central trend parameter

A.1. The arithmetical average (X). It is a statistic indicator characterizing the common features of a group; Unfortunately, it can hide some individual important features. It is calculated according to this formula:

$$\bar{X} = \frac{\sum X}{n}$$

B. The dispersion parameters

B.1. The standard deviation (σ). At a low level dispersion we'll obtain a more representative mathematical average, and the opposite. It is calculated according to the formula:

$$\sigma = \pm \frac{V_{\max} - V_{\min}}{K}$$

B.2. The standard error of the average (m). It is given by the ratio between *The standard deviation of the distribution (σ)* and the radical of *the students' number (n)*:

$$m = \frac{\sigma}{\sqrt{n}}$$

B.3. The variability coefficient (v). It represents the multiplied with 100 ratio between *the standard deviation (σ)* and *the arithmetical average (X)*; it offers the level of the homogenousness of each group and makes possible the comparison of the groups to different measurement standards (v). It is calculated according to the formula:

$$V = \frac{\sigma}{M} \cdot 100$$

(A group is considered: *homogenous* (small variability) if $C_v < 10\%$; *relative homogenous* (medium variability) if $10\% < C_v < 20\%$; *non-homogenous* (large variability) if $C_v > 20\%$).

B.4. The statistical significance of the difference between medias (t), ("Student"-test). We used «T» test („Student” test), which we compared to the «t» value from the reference table (Fisher's table), at a significance threshold of 0,05 and also at significance threshold, the number of freedom degrees being equivalent with $n = 1$. It is calculated according to the formula:

$$t = \frac{\bar{x}_1 - \bar{x}_2}{\sqrt{m_1^2 + m_2^2}}$$

C. The statistical co-relation parameters

C.1. The co-relation coefficient by the ranks method - SPEARMAN, calculated according to the formula:

$$r^1 = 1 - \frac{6 \cdot \sum D^2}{n \cdot (n^2 - 1)}$$

C.2. The co-relation coefficient by PEARSON method, calculated according to the formula:



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$$r = \frac{\sum d_x \cdot d_y}{(n-1) \cdot S_x \cdot S_y}$$

The processing and the statistical interpretation of the scientific investigated parameters gave a maximal level of impartiality and certainty concerning the need to avoid the subjective attitude and the accidental results.

II. THE MULTIPLE TESTING OF THE SPECIFIC PHYSICAL TRAINING

We'll also present here:

III. SOME RESULTS, finally obtained when realizing the estimating tables of the student's value of the training.

1. The specific force, accumulated (arms scapular belt, body, legs) in the endurance conditions. The parameter has been tested by the following specific test: **pulling the rope** in an orthostatic position in order to raise a heavy weight.²



The weight consists in 25 kg., hooked at the end of a rope, passed over a windlass positioned higher, over the weight. In order to lift the weight, the student has to pull the other end of the rope at some 45 degrees ankle. The total number of pullings at 1 meter high is

² „Pulling the rope” - The motional act is a compound of the professional activities and of the motional specific daily requests aboard ships.

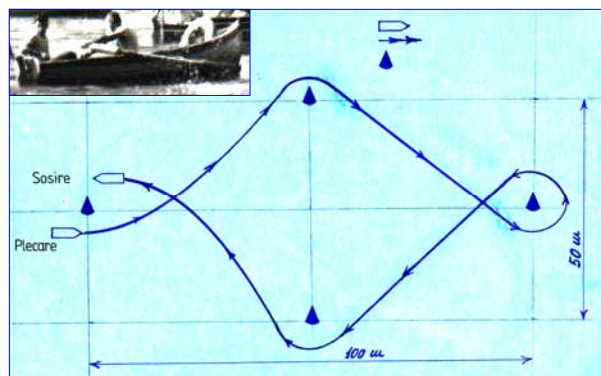
recorded, along 90”. The resulting appreciation scale is:

NOTES	Number of raises	The level of appreciation
10	≥ 34	FB
9	32-33	B (28-33)
8	30-31	
7	28-29	
6	26-27	M (22-27)
5	24-25	
4	22-23	
3	20-21	S (18-21)
2	18-19	
1	≤ 17	NS

2. The speed of the execution, the skill, the general coordination, in forcing and specific endurance. This parameter was tested by the following two tests:

2. a. Rowing in the single place boat, called „the baby boat”.

The subject rows under his maximum capability level (the length of the rowing is at its highest amplitude, and the rhythm is of 32/minute). The itinerary of the boat is of a rhumb shape the diagonals of 100 and 50 meters. The subject has to cover the itinerary avoiding the buoys fixed in the water. He has a lifebuoy in his boat, and a partner to help guiding his rowing.



They time the time the navigator covers the itinerary with his boat, the appreciation levels (a scale) for this specific test being the following:

NOTES	Recorded time	The level of appreciation
10	≤ 4'15"	FB
9	4'16-4'30	B (4'16"-5'00")
8	4'31-4'45	
7	4'46-5'00	
6	5'01-5'15	M (5'01"-5'45")
5	5'16-5'30	
4	5'31-5'45	
3	5'46-6'00	S (5'46"-6'15")
2	6'01-6'15	
1	≥ 6'16"	

We do not have room enough to expose the whole schedule of the special training as we thought it for the experimental group and the differences between the results of them compared to the witness group. Actually, they were exposed on some other different occasions.

As we can easily notice the results of our research were materialized in these tables, strictly impartialized, containing value levels very helpful in the leading of future specific training programs. All that, helping the next naval students to progress.

2. b. Dressed swimming (a shirt and trousers on) on 50 meters, in the swimming pool.



The appreciation scale was the following one:

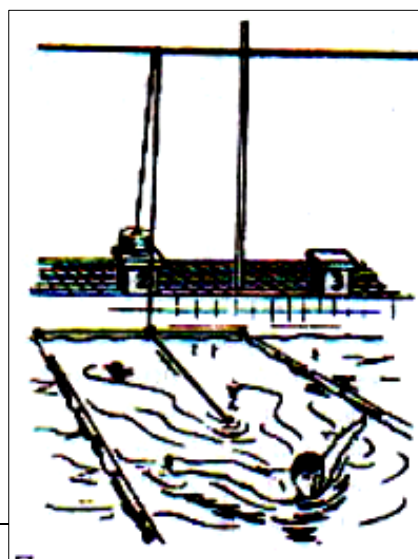
NOTES	Recorded time	The level of appreciation
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10	≤ 1'10"	FB
9	1'11-1'20	B (1'11"-1'40")
8	1'21-1'30	
7	1'31-1'40	
6	1'41-1'50	M (1'41"-2'10")
5	1'51-2'00	
4	2'01-2'10	
3	2'11-2'20	S (2'11"-2'30")
2	2'21-2'30	
1	≥ 2'31"	NS

3. The specific endurance (in forcing, coordination and skillfulness) in the applied utility swimming

The parameter was tested by the following specific tests:

3. a. Pulling the rope during the swimming. The student swims equipped with the shirt and the trousers and the lifebuoy. His lifebuoy is tied with a rope. The other end of the rope is passed over a double windlass („palanc”) and tied to a „crane” lifting a weight of two kilos. The student pulls swimming the weight using that special „palanc” (an adapted helcometer) and tries to maintain it at a constant height. They record the time the subject can maintain the weight at a height between 30 and 50 cm. pulling it by swimming.³



³ Note: Successful in any kind of water, having the helcometer fixed on the bank, as well as in the small swimming pool aboard ships, for example, as we did aboard the school ship “Neptun”.



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The appreciation scale is the following one:

NOTES	Recorded time	The level of appreciation
10	≥ 121''	FB
9	111''-120''	B (91''-120'')
8	101''-110''	
7	91''-100''	
6	81''-90''	M (61''-90'')
5	71''-80''	
4	61''-70''	
3	51''-60''	S (41''-60'')
2	41''-50''	
1	≤ 40''	NS

3. b. The transportation during the swimming, of the lifebuoy, an equipment set and of the AK, along 50 meters.⁴

The thorough description of the test is the following: the subject comes in front of the swimming pool start the AK and the tarpaulin in his hands and has a circle lifebuoy nearby.

The moment they give the start signal, they start the chronometer, the subject get rapidly undressed packs his tarpaulin, the boots, socks, the cap, the belt, the bayonet, the bag with three loaders. He keeps on only his shirt and the trousers. He jumps in the water having the whole pack folded over the circle lifebuoy and pushes it while swimming along the 50 meters distance.



The scale and the appreciation times are the following:

NOTES	Recorded time	The level of appreciation
10	≤ 2'10''	FB
9	2'11-2'15	B (2'11''-2'25'')
8	2'16-2'20	
7	2'21-2'25	
6	2'26-2'30	M (2'26''-2'40'')
5	2'31-2'35	
4	2'36-2'40	
3	2'41-2'45	S (2'41''-2'50'')
2	2'46-2'50	
1	≥ 2'51''	NS

4. The speed of the movement, the specific skill and the general coordination in the terms of the real conditions aboard ships.

The parameter was tested by an *applied itininerary of a rapid race aboard ship*, which included the following specific compounds: The student, the lifebuoy on, starts from the deck at the pilot's ladder, runs along the commander's deck to the back of the ship for 10 meters takes a lifebuoy from its place gets down some 3 meters on the inferior deck and runs to the prow to a previously established place, 15 meters nearby the pilot's ladder (totally: 10 m to the rear of the ship + 3m getting don on a ladder + 10 m + 15 m run the lifebuoy on to the prow + 38 meters). He puts back the lifebuoy in the hook, jumps out in the water (from 3-4 meters) keeping his lifebuoy tight on, swims to the pilot ladder (15 m.) climb it up (5 m.) vertically

aboard o the command deck, the very place he started.⁵

They record the time the naval student covers the itinerary.

Here they are the times of appreciation:

NOTES	Recorded time	The level of appreciation
10	≤ 64''	FB ⁶
9	65'' - 67''	B (65''-73'')
8	68'' - 70''	
7	71'' - 73''	
6	74'' - 76''	M (74''-82'')
5	77'' - 79''	
4	80'' - 82''	
3	83'' - 84''	S (83''-87'')
2	85'' - 87''	
1	≥ 88''	NS

IV. CONCLUSIONS

The exceptional physical effort and the specific involved in the navigation includes a very serious training of the naval students, future officers, either in the Military or Civilian Navy. We considered the persons, as officers, will develop a responsible professional activity according to the different conditions the ergonomy of ship they'll serve, will usually offer their best, in normal and unusual weather conditions. That means the balance the couple man-sea, will function all the time, no matter the weather.

V. METHODOLOGICAL RECOMMENDATIONS

Considering some of the tests targeting the *physical and specific psycho-motional training* have a high difficulty level and they request at a special level the effective capacity of the subjects in this field, a good *physical training* of the subjects as well as a *motional*

⁵ This test is applied at the end only, after the students can gather the multiple specific motional capacity and, after a thoroughly training on each compound of the named test.

⁶ **FB** = very good; **B** = good; **M** = medium acceptable; **S** = almost satisfying; **NS** = not-satisfying.

capacity and a *specific skill* is needed to get over these tes.

We'll also have to permanently take into account *the experimental ethics* in order the own over-evaluation of some subjects, the wish, the need to be seen on the first place, better than the others, not to provoke accidents, during the training and the tests as well.

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