Original Article

Intelligence influence in beginner student learning of sailing

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Published online: March 25, 2015

(Accepted for publication: March 15, 2015)

DOI:10.7752/jpes.2015.01019;

Abstract:

Intelligence and attention underlie learning, someone cannot learn if he is not smart, and even if smart can learn only if he is paying attention to what he is learning. In sailing from the beginner level to even the great performance subjects meets in permanent new situations created by the aquatic environment which is not the usual environment of man, by working with a device (boat) which is constantly influenced by environmental factors, and not least by the opponents actions in competition or other craft in a traffic area in terms of recreational yachting. The purpose of this study was to evaluate the influence of intelligence in learning the Ypton 22 boat handling. For this, the subjects were tested with the Raven Progressive Matrices test and with the test for Ypton 22 boat handling techniques on a trapezoidal course. The study conducted on students in Constanta Maritime University noted that the initiation of intelligence is correlated with the technical preparation recorded for trapeze sailing course. Intelligence level directly affects the sailing boats handling, higher level of intelligence will be determined higher level of sailing boats handling. This is also proved in the case of individual development on crew station.

Keywords: intelligence; technique; Ypton 22; learning; sailing.

Introduction

Sailing is demanding, from the beginner level to great performance level, permanent adaption to new situations created by the aquatic environment, by working with a device (boat) which is constantly influenced by environmental factors, and by the opponents actions in competition or other craft in a traffic area in terms of recreational sailing. We found that M., Golu define intelligence as "the ability to establish relationships between objects, phenomena and events as diverse as possible"[1]. C. Peterson states about intelligence that "when we act we show our intelligence as an adaptation, confronting and overcoming challenges that arise at a time." [2], S., Ceci consider that "schooling fosters the development of cognitive processes that underpin performance on most IQ tests" [3]. Regarding attention J., Delay and P., Pichot, cited by M., Zlate considers attention as "the active aspect of selective perception, which consists of individual preparation and orientation to the perception of a particular stimulus" [4]. A., Cosmovici states that "attention consist in focus of mental cognitive orientation on an object or phenomenon" [5]. We can say that during sailing attention is the one that can determine the collection of information from the environment which are immediately cognitive processed based on intelligence. From these statements we believe that the higher level of intelligence can increase the technical level of Ypton 22 sailing boat handling.

Based on research premises we formulated the following hypotese:

- Subjects with a high level of intelligence will record upper technique results;

Paper purpous

The paper's purpose was to investigate if intelligence has influence on beginners learning of sailing at 20 years old university students.

Methods

In this study subjects were selected from among the students of the first year of specialization: navigation, electromechanical and electrotechnics; these subjects never sail before with sailing boats. The number of students selected was 18, all boys aged between 20 and 22 years. Were used two boats Ypton 22 with teams of three (one skipper and two crew) due to the use spinnaker. Subjects were measured anthropometric (body weight and height) and tested by a clinical psychologist to determine their level of intelligence and attention. Height was estimated with an error of 0.5cm. And body weight was measured using a calibrated

electronic scale (Beurer GS27, China), with an error of 0.1 kg. To assess weight subjects were dressed lightly. After these test subjects were divided into teams. In the skipper position were assigned the subjects with the highest values of intelligence, the crew members were distributed randomly.

Evaluation of the subjects included in this study was conducted in four stages. In the experiment beginning part were conducted anthropometrical measurements, psychological testing with Raven Progressive Matrices test for intelligence and Prague test for attention, this testing session was noted as "T1". After this testing session the subjects were trained for 2 weeks in 2 theoretical and 4 practical sailing classes. The purpose of this stage was to establish a minimum of knowledge about sailing in order to test the sailing boat maneuverability skills of each subject and team. After this 2 weeks subjects were tested again to determine their IQ, attention level and boat handling ability, this testing session was noted as "T2". Sailing training and theoretical classes were sustained for another 14 weeks period. After seven weeks of training subjects were tested again (as in T2), this testing session was noted as "T3". After the 14th week the subjects were tested for the last time (as in T2), this final testing session was noted as "T4". Subjects were psychologically tested at each testing session to determine if intelligence is increased or decreased during sailing training period. As sailing training sessions involved a lot of theoretical informations and practical training exercises it would be possible to affect in a positive way the student's IQ level.

Theoretical training program included 60 hours and were used the following materials: a classroom; a video projector; a computer; a flipchart; a magnetic board, a miniature model of a sailing boat. In the theoretical part were used diagrams, charts, audio-video recordings and Virtual Skipper 5 simulator. In the practical lessons were used two Ypton 22 sailing boats, a motor boat (90 hp), a shaped "T" floating pontoon, 8 inflatable buoys, 19 life jackets, a clock with timer and a mobile electronic anemometer.

During training have been applied "on water" exercises, "tied at pontoon" exercises and mental training exercises. In practical lessons were used two boats simultaneously. To maintain the same level of work with all teams, workouts were held on the same day with all teams so that each of them have the same atmospheric conditions. The training area used in this study was the water surface situated in the south-wester side of the Suițghiol Lake. The training was held in different weather conditions from one lesson to another, between 0 and 4 force wind on the Beaufort scale [6]. The theoretical courses were held simultaneously with all subjects involved in the experiment.

In the study were used Raven Progressive Matrices to determine IQ, The Praga Test to determine the attention level and Sailboat handling technique test on trapezoidal course to determine the level of sailing technique of which subject and team.

This test was applied according to the characteristics of the Ypton 22 sailing boat. It requires the going through a sailing route which is between four yellow buoys forming four sides to go. To mark the starting point of the test was used a green mark, for starting line was used a green mark and for the finish line was used a blue mark. For this test the starting line is 20 meters long and can be placed so that the craft could round the buoy number 4 with the boat's port side, this buoy is also starting mark. The route can be increased up by 100 meters on the each leg to be made in 5 to 7 minutes. During the examination the wind force shall be between 1 Beaufort and shall not rotate more than 15 degrees. Each skipper is free to choose the starting moment.

In this test the examiner check the correctness or failure of technical actions on a check list which contains 13 key points that a subject or team must perform on the sailing course. Each key point contains four tasks to be performed by each crew member. In order of determine the sailing boat handling technique the test will be made only for one boat at the time.

Fig. 1 Sailboat handling techniques test on trapezoidal course

The trapezoidal sailing course dimensions are:

- 100 m between starting mark and mark number 1;
- 70 m between mark number 1 and mark number 2;

- 90 m between mark number 2 and mark number 3;
- 80 m between mark number 3 and finish mark.

The technique elements been evaluated during the test were: roundind of starting mark, tacking, rounding of the first mark, spinnaker hoist, coming onto the wind when beam reaching, baring away when beam reaching, rounding second mark, coming onto the wind when running, gybig, rounding third mark, coming onto the wind when broad reaching, baring away when broad reaching spinnaker dropping.

Scores on this test were assigned to each crew member separately. Each task has a value of 1 point, each crew member can obtain a score between 0 and 52 points. The time for the route is not recorded due to the differences that can occur due to oscillation of the wind speed.

Statistical indicators of appreciation were represented by: mean (M) $\pm$ standard deviation (SD) and coefficient of variation (CV), calculated using the formula:

$$CV(X) = \frac{SD}{M} * 100$$

One-way ANOVA test for dependent samples and Tukey HSD test for dependent samples were applied to examine the differences between the values obtained from tests Raven crews, Prague and technical test. Pearson correlation test was used to determine the relationship between the intelligence, the attention and the sailing boat manuverability skills level. For this study, the level of significance (α - alpha) was set at $p < 0.05$.

Results

The results of age and anthropometric development on the team's subjects show no relevant differences. Also there are significant differences in age, height and weight between the diferent crew positions (subjects occupying skipper, crew1 or crew 2 positions). Because the experiment's duration and due the fact that the subjects are at an age at which no change of growth occurs hasn't been made any other anthropometrical test.

Results of age and anthropometric development (teams) are characterized by the following statistical data:

- Arithmetic mean age of the subjects is $21^1 \pm 0^9$ (years^{months}) and CV = 3.42%;
- Arithmetic mean height of the subjects is 173.88 cm and CV = 2.99%;
- Arithmetic mean weight subjects is 75.43 kg and CV = 6.89%;

Table 1 - Team's age and anthropometrical results

Team no.	M $\pm$ DS (years ^{months})	CV(%)	M $\pm$ DS height (cm)	CV(%)	M $\pm$ DS weight (kg)	CV(%)
1	$21^7 \pm 0^9$	3.58	174.66 ± 6.50	3.72	73.66 ± 4.02	5.46
2	$20^9 \pm 0^9$	3.62	179.66 ± 4.72	2.63	81.16 ± 9.43	11.61
3	$20^7 \pm 0^5$	2.03	171.66 ± 3.51	2.04	73 ± 2.33	3.18
4	$21^8 \pm 0^8$	2.91	174.33 ± 4.50	2.58	75 ± 3.70	4.93
5	$21^8 \pm 0^7$	2.62	172.33 ± 4.93	2.86	75.76 ± 4.82	6.37
6	$20^6 \pm 0^3$	1.3	170.66 ± 5.50	3.22	73.8 ± 4.01	5.44

M, arithmetic mean; SD, standard deviation; CV, coefficient of variation.

Table 2 - Crew possitions age and anthropometrical results

Crew possition	M $\pm$ DS (years ^{months})	CV(%)	M $\pm$ DS height (cm)	CV(%)	M $\pm$ DS weight (kg)	CV(%)
Skipper	$20^{10} \pm 0^8$	3.21	174.16 ± 7.13	4.09	77.01 ± 8.37	10.86
Crew 1	$21^2 \pm 0^8$	3.08	172.50 ± 4.23	2.45	73.7 ± 2.78	3.77
Crew 2	$21^5 \pm 0^{10}$	3.92	175 ± 4.38	2.5	75.58 ± 2.72	3.6

M, arithmetic mean; SD, standard deviation; CV, coefficient of variation.

Table 3 - Evolution of the average values of the results of teams at Raven, Prague and technique tests at T1, T2, T3 and T4.

			E1	E2	E3	E4	E5	E6
T 1	Raven	M $\pm$ DS	105.66 ± 8.14	96.66 ± 7.37	99.33 ± 13.57	98 ± 8.88	102.66 ± 13.2	99 ± 6.55
		CV(%)	7.70	7.62	13.66	9.06	12.86	6.62
	Prague	M $\pm$ DS	94.66 ± 4.61	97 ± 5.19	95.33 ± 4.50	96.66 ± 4.16	96 ± 5.29	95.33 ± 8.08
		CV(%)	4.87	5.35	4.73	4.30	5.51	8.47

T 2	Raven	M ± DS	105.66 ± 8.14	96.66 ± 7.37	99.33 ± 13.57	98.33 ± 8.50	103.33 ± 12.34	99.33 ± 6.02
		CV(%)	7.70	7.62	13.66	8.64	11.94	6.06
	Technique	M ± DS	20.66 ± 2.88	17.66 ± 2.88	18.33 ± 4.04	17.33 ± 2.30	19.33 ± 6.11	19 ± 1.73
		CV(%)	13.96	16.34	22.04	13.32	31.60	9.11
T 3	Raven	M ± DS	105.66 ± 8.14	97 ± 7	99.33 ± 13.57	98 ± 8.88	103.33 ± 12.34	99.33 ± 6.02
		CV(%)	7.70	7.21	13.66	9.01	11.94	6.06
	Technique	M ± DS	31.33 ± 1.52	24.33 ± 5.13	26.33 ± 4.93	22.66 ± 4.72	29 ± 4.58	23.33 ± 3.51
		CV(%)	4.87	21.09	18.73	20.85	15.80	15.05
T 4	Raven	M ± DS	105.66 ± 8.14	97 ± 7	99.33 ± 13.57	99 ± 7.81	103.33 ± 12.34	99.33 ± 6.02
		CV(%)	7.70	7.21	13.66	7.88	11.94	6.06
	Technique	M ± DS	42 ± 7	37.33 ± 3.21	38.33 ± 8.38	39.33 ± 5.13	39.66 ± 9.07	36.33 ± 2.51
		CV(%)	16.66	8.61	21.87	13.04	22.87	6.92

Significance level set at $p < 0.05$

M, the arithmetic mean; SD, standard deviation; CV, coefficient of variation; E crew; T1, testing for selection; T2, initial testing; T3 testing intermediate; T4, final testing; E, team.

Intelligence level registered between the values of 117 and 91 and a level of attention between 100 and 86. The IQ's coefficient of variation shows that team 1, 2, 4 and 6 are homogeneous and team 3 and 5 fall in average homogeneity. Variation coefficient of attention shows an increased homogeneity in all 6 teams.

Table 4 – Individual results at Raven and technique tests

R-T2	Teh-T2	R-T3	Teh-T3	R-T4	Teh-T4
115	24	115	33	115	50
100	19	100	30	100	37
102	19	102	31	102	39
105	21	105	30	105	41
91	16	92	20	92	35
94	16	94	23	94	36
115	23	115	32	115	48
92	16	92	24	92	33
91	16	91	23	91	34
108	20	108	28	108	45
92	16	91	19	94	35
95	16	95	21	95	38
117	26	117	34	117	50
93	18	93	25	93	33
100	14	100	28	100	36
105	20	105	27	105	39
93	17	93	20	93	34
100	20	100	23	100	36

R, Raven test; Teh, Technique test; T2, testing session 2;

T3, Testing session 3; T4, Testing session 4

Chart 1 – Individual results at testing session 2 at Raven and Technique test

Chart 2 - Individual results at testing session 3 at Raven and Tehnique test

Chart 3 - Individual results at testing session 4 at Raven and Tehnique test

Table 5 – Correlation level between Raven and Tehnique tests results

		T2	T3	T4
Raven	M ± DS	100.44 ± 8.75 (a)	100.44 ± 8.75 (b)	100.61 ± 8.59 (c)
	CV(%)	8.71	8.71	8.53
	r	0.9	0.87	0.95
Tehnică	M ± DS	18.72 ± 3.25	26.16 ± 4.80	38.83 ± 5.68
	CV(%)	17.35	18.36	14.62
C Raven/Tehnică	Isr (%)	81	76.73	91.96
	p	p<0.05	p<0.05	p<0.05

Significance level set at p < 0.05

M, the arithmetic mean; SD, standard deviation; CV, coefficient of variation; T2, initial testing; T3 testing intermediate; T4, final testing; r, Isr, .

a - Significantly correlated with T2 technical test , r = 0.9

b - Significantly correlated with the T3 test technique , r = 0.87

c - Significantly correlated with T4 technical test , r = 0.95

Pearson correlation test showed that between Raven and technique test results are the following links:

- at T2 correlation is significant at p < 0.05, interpreting the significance of r shows an influence of intelligence on the technical level of 81%;
- at T3 correlation is significant at p < 0.05, interpreting the significance of r shows an influence on the level of technical intelligence of 76.73%;
- at T4 correlation is significant at p < 0.05, interpreting the significance of r shows an influence on the level of technical intelligence of 91.96%;

Discussions

Technical training has increased both between crew values and between values obtained from testing positions. There is a steady increase in values technique. There is a greater increase at all stations between T3 and T4 than between T2 and T3 which can be explained by the increased workload and exercises using the trapeze sailing course.

After applying the Pearson correlation test was observed that intelligence is correlated with the level of sailing boats maneuverability skills.

Conclusions

Taking into account the analysis and interpretation of data we found out the following conclusions : Intelligence directly affects the handling of sailing boats. Higher level of intelligence of one subject determine higher level of handling sailing boats. So the hypothesis that subjects with a high level of intelligence will record upper technique results was confirmed as Pearson correlation test application and according to statistical and mathematical analysis which highlights the progress the teams and positions .

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