VALIDATION OF THE SCALES FOR ASSESSING SWIMMING ABILITIES OF STUDENTS AT THE FACULTY OF HUMANITIES AND SOCIAL SCIENCES IN ZAGREB

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Abstract

The aim of this study is to validate two scales for assessing swimming abilities of undergraduate students. The scale 1 is divided in five categories according to Grčić-Zubčević (1996), while the new scale 2, based on Špehar, Gošnik and Fučkar Reichel (2010), consists of twelve questions, with the range of answers from 1 to 5 (don't know, weak, medium, good and very good), that students use to self-assess their swimming abilities. This research was conducted on a sample of 949 freshmen at Faculty of Humanities and Social Sciences in academic year 2010/11.

Multiple regression analysis shows high, statistically significant ($p<0,05$), level of correlation ($R=0,72$; $p=0,0000$) between two methods or scales for evaluation of swimming abilities of students. The beta coefficient demonstrates that statistically significant contribution to correlation provide variables 5, 6, 8, 9, 10, 11 and 12 (elaborated in section 4). This confirms the hypothesis that self-assessment of swimming abilities according to the scale 2 is a good predictor of results based on self-assessment based on the scale 1. In other words, the both scales are valid for evaluation of specific parameters.

Key words: *physical and health culture, metric characteristics and institution of higher education*

Introduction

Course in Physical and Health Culture is a regular part of curriculum at Faculty of Humanities and Social Sciences at University of Zagreb. Educational Plan and Program that represents extension of preceding programs in elementary and high school guide this undergraduate course. Swimming as a crucial motor skill is a part of the basic program. It proposes mandatory examination of swimming skill for all 1st year students (freshmen) and sending non-swimmers to a swimming school appropriate for their age.

Systematic diagnosis of initial anthropological status of 1st year students at Faculty of Humanities and Social Sciences conducted via non-anonymous survey ten years in a row shows that self-assessment of swimming skills is not at an appropriately high level. "Can you jump on legs in a deep water and swim 50 meters using any technique? Circle YES or NO" was the selected question to evaluate swimming skill in adults. This question was specifically presented to freshmen during eight consecutive years. Surveys from 2002 to 2009 show that female students negatively assessed their swimming skill in the range from minimum of 15,9% in academic year 2008/09 to maximum of 31,9% in academic year 2007/08. Negative self-assessment for male students ranged from minimum of 10,5% in academic year 2008/09 to maximum of 22,7% in academic year 2007/08. According to Gošnik et al, (2010) this analysis shows rather negative self-evaluation of swimming skills in surveyed freshmen.

Study of Špehar et al., 2010, conducted on a sample of 1391 students from three different institutions of higher education shows a substantial numbers of non-swimmers and semi-swimmers among student population (36%). There is no statistically significant difference among students from different higher-education institutions, but there is relevant difference among different counties from where students originate and different genders.

Due to rather abstruse results from the survey of self-assessed swimming skills during academic years 2009/10 and 2010/11, we incorporated additional question based on criterion for assessing swimming abilities according to Grčić-Zubčević (1996). Based on results of 2009/10 survey, as well as feedback inputs from students and long-term experience of the authors, we can discern that used criteria for estimating swimming abilities were not the most fitting for students, but more appropriate for professional assessment and training of non-swimmers. Inside one category there are several parameters that need to be fulfilled, hence to students it is not obvious and sometimes hard to assess level of their swimming ability. Therefore, the authors propose another scale for assessing swimming abilities that was used along with the previous one during survey of freshmen in academic year 2010/11.

The goal of research

The aim of this study is to validate and compare scale 1 for criteria of swimming ability that is divided in five categories according to Grčić-Zubčević (1996) and new proposed scale 2 (Špehar, Gošnik and Fučkar Reichel, 2010). Scale 2 consists of twelve points with spectrum of answers ranging from 1 to 5 (do not know, weak, medium, good, and very good) that students use while making self-assessment of their swimming abilities.

Methods

Sample of examinee

Undergraduate students at Faculty of Humanities and Social Sciences are selected as sample for this study. Survey conducted in July 2010 (during enrolment in the first year) encompassed 949 examinees.

Method of data gathering

Freshmen completed non-anonymous survey containing 32 questions that included two analyzed in this study, along with other forms during enrolment period.

Variables and data processing

Predicative variables

Predicative set of variables is defined via twelve statements specifying different levels of swimming abilities used for self-assessment. Statements are associated with five-grade scale, from 1 – don't know, to 5 – very good. The following 12 statements were included in this survey: floating, open eyes under water, swim in deep water, jump on legs and head, transition from horizontal to vertical position and back, dive, recover of items from the bottom, breaststrokes, freestyle, backstroke and dolphin.

Diagnostic variables

Diagnostic or criteria variables are represented in table containing grades for established level of swimming ability from 1 to 5. Described criteria on five-grade scale are: unadjusted, floater, semi swimmer, junior swimmer, and swimmer. Every category is detailed through several tasks described in Table 1. Regression analysis was applied to examine relation between two scales.

Results and discussion

Table 1. Distribution (N) and percent of freshmen at Faculty of Humanities and Social Sciences during academic year 2010/11 grouped according to the scale 1 – level of swimming ability

SCALE 1 – levels of swimming ability	Grade	N	%
1. Enters water and floats – with assistance; can open eyes in water1.	1	24	2.52
2. Enters water independently; floats horizontally; glides through water, can use legs and hands; swim up to 10m in any manner; can make 3 consecutive inhales and exhales in water	2	190	19.94
3. Can jump in water; swim 10 to 25m in any manner with breathing; can make 10 consecutive inhales and exhales in water; can retrieve objects from bottom in shallow water	**3**	**232**	**24.34**
4. Can jump on legs into water; can swim 25m or more; can stay vertically in water for more than 10s; 10 consecutive inhales and exhales in water; can retrieve objects from bottom via diving on head	4	142	14.90
5. Can jump on head into water; can jump on head into deep water; swimming for 50m (25m breaststrokes and 25m backstrokes); maintaining vertical position in water by hand more than 10se; retrieve objects from deep bottom by diving with head down	5	361	37.88

Table 1. shows precent of answers in each category, 1 thorugh 5, used in self-assessment of swimming abilities of students. A point for concern is that out of 949 freshmen 446 (47%) gave positive respond to first three catagories of answers that in general sense corresponds to categories of non-swimmers and semi-swimmers.

Table 2. Number of answers in each category (N) and the corresponding percentages grouped according to the scale 1 for self-assessment of swimming abilities from point 1 to point 12

SCALE 2 - claim	1 can not		2 weak		3 medium		4 good		5 very good	
	N	%	N	%	N	%	N	%	N	%
1. Can float (lay steady)	7	0.73	16	1.68	38	3.99	173	18.15	708	74.30
2. Can open eyes under water.	59	6.20	80	8.39	124	13.01	186	19.52	492	51.63
3. Can swim in deep water.	21	2.20	15	1.57	62	6.51	177	18.57	668	70.09
4. Can jump on legs.	20	2.10	18	1.89	64	6.72	134	14.06	710	74.50
5. Can jump on head.	130	13.64	131	13.75	176	18.47	152	15.95	353	37.04
6. Can switch between horizontal and vertical positions.	29	3.04	35	3.67	102	10.70	236	24.76	542	56.87
7. Knows to dive.	36	3.78	68	7.13	128	13.43	202	21.20	508	53.30
8. Able to retrieve objects from bottom.	65	6.82	67	7.03	138	14.48	213	22.35	457	47.95
9. Knows breaststrokes.	32	3.36	36	3.78	139	14.58	278	29.17	459	48.16
10. Knows freestyle.	85	8.92	116	12.17	244	25.60	197	20.67	299	31.37
11. Knows backstrokes.	62	6.51	95	9.97	223	23.40	259	27.18	302	31.69
12. Knows dolphin.	222	23.29	234	24.55	225	23.61	116	12.17	147	15.43

Table 3: Arithmetic mean ($\overline{X}$), standard deviation (SD), frequency (N) of the results from the two analyzed scales of swimming abilities

Variable	N	$\overline{X}$	SD
Level of swimming ability	949	**3.66**	1.24
1	942	4.65	0.71
2	941	4.03	1.25
3	943	4.54	0.86
4	946	4.58	0.86
5	942	3.50	1.45
6	944	4.30	1.00
7	942	4.14	1.13
8	940	3.99	1.24
9	944	4.13	1.03
10	941	3.54	1.29
11	941	3.68	1.21
12	944	2.72	1.36

According to the scale 1 average self-assessed grade of swimming ability is 3.66 (Table 3.). The strongest correlation on this scale is found with statements 5, 6, 8 and 10 from the scale 2 that should comparable average grade of swimming ability (between 3,5 and 4,3).

Table 4. Beta coefficients and their significant inter-dependence for the two tested scales of self-assessment of swimming abilities.

Variable	Statistical parameters		
	b	t(848)	p
1. Can float (lay steady)	-0.02	-0.80	0.4226
2. Can open eyes under water.	0.03	1.04	0.2995
3. Can swim in deep water.	-0.01	-0.33	0.7448
4. Can jump on legs.	0.05	1.45	0.1476
5. Can jump on head.	**0.25**	7.95	0.0000*
6. Can switch between horizontal and vertical positions.	**0.16**	4.79	0.0000*
7. Knows to dive.	0.02	0.35	0.7233
8. Able to retrieve objects from bottom.	**0.16**	3.71	0.0002*
9. Knows breaststrokes.	**0.10**	3.23	0.0013*
10. Knows freestyle.	**0.16**	4.38	0.0000*
11. Knows backstrokes.	**0.09**	2.47	0.0135*
12. Knows dolphin.	-**0.06**	-2.15	0.0317*
R= 0.72; R^2= 0.52; F(12,897)=81.6; p=0,0000?			

Multiple regression analysis (Table 4) shows a high, statistically significant ($p<0,05$) degree of correlation ($R=0,72$; $p=0,0000?$) between two analyzed methods for assessing swimming abilities of freshmen at Faculty of Humanities and Social Sciences during academic year 2010/11. The values of beta coefficient attest that statistically significant contribution to the correlation make variables 5, 6, 8, 9, 10, 11 and 12. This confirms thesis that self-assessed swimming ability according to the scale 1 is a good predictor of the results according to the scale 1. Thus, we can conclude that both scales provide us with appropriate methods for evaluation of considered parameters.

Conclusions

Results of this study show that for self-assessment of swimming abilities among undergraduate students scale 1 is a useful measure overall comparable to new proposed scale 2. This is indicated by validation of results of these scales via multiple regression analysis.

Based on our professional experience we consider scale 1 to be more appropriate for an objective estimate. A grade on the scale 1 requires fulfillment of several criteria, while estimate based on scale 2 is simpler and more straightforward due to evaluation of every statement only by one criterion.

The fact that a significant number of students that can be categorized as non-swimmers or semi-swimmers is something that should certainly concern us. We could acquire more complete results during a test at swimming pool, however due to a sizable number of students, and obvious material and financial limitations that is not a feasible approach.

Swimming is a motor activity of high utility; hence we suggest that further effort should be placed to reduce percent of non-swimmers. In the present day modern society swimming ability should be considered something essential to every adult (especially to a student at institution of higher education if he or she did not master swimming at earlier age).

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