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## **ATHLETICS TEACHING UNITS IN THE SCHOOL CURRICULUM OF PE – A DISCREPANCY BETWEEN EDUCATIONAL OBJECTIVES AND THE PUPILS' NEEDS AND INTERESTS?**

### **ĀLETIKA V UĀNEM NAĀRTU ŐOLSKE ŐPORTNE VZGOJE - PROTISLOVJE MED VZGOJNIMI SMOTRI TER POTREBAMI IN INTERESI UĀENCEV?**

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#### **ABSTRACT**

The purpose of the study was to study some athletics teaching units from the school PE curriculum from the viewpoint of the pupils' physical loads and their attitude towards these units.

It is possible to conclude on the basis of the obtained results that the loads of the functional systems of the pupils at athletics PE units are large enough to trigger adaptational processes in the body. The effort level in athletics teaching units did not affect the relatively low assessment of the unit from the pupils, this assessment was also not influenced by the popularity of the sport.

Athletics (track and field) in school PE demands new approaches with accent on playfulness, joy, realisation of physical activity, satisfaction in learning and a new concept of competitiveness, while preserving sufficient physical loading.

*Key words: athletics teaching units, physical education, physical loading, curriculum*

#### **IZVLEĀEK**

Namen raziskave je bil prouĀiti nekatere atletske vsebine iz programa Őolske Őportne vzgoje z vidika fiziĀne obremenitve uĀencev in njihovega odnosa do teh vsebin.

Na osnovi rezultatov je mogoĀe zakljuĀiti, da je obremenitev funkcionalnih sistemov uĀencev pri uĀnih urah atletike dovolj velika za razvoj adaptacijskih procesov v organizmu. Stopnja napora pri urah Őportne vzgoje z atletske vsebine ni vplivala na relativno slabo oceno uĀencev o vadbeni uri, prav tako pa na to oceno tudi ni vplivala priljubljenost Őportne panoge pri uĀencih.

Atletika v Őolski Őportni vzgoji terja nove pristope s poudarkom na igrivosti, radosti, uresniĀevanju telesne dejavnosti, zadovoljstvu ob uĀenju, novo pojmovanje tekmovalnosti ob ohranjanju ustrezne telesne obremenitve.

*KljuĀne besede: uĀne ure atletike, telesna vzgoja, telesna obremenitev, uĀni naĀrt*

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## INTRODUCTION

The current transformation of school systems and curricula in Europe requires that Physical Education (PE) in schools also respects the trends of development and plays a major role in education. The changing didactic conceptions, therefore, permanently deal with the discrepancy between the goals derived from the school system of education and the actual interests, needs and attitudes of the pupils and their life style, the axiological system, etc. (Beckers, 1995; Crum, 1995; Crum, 1998; Rink, 1992; Zeuner, 1995). No less urgent and difficult is the solution of the problem of the so-called traditional conception of PE as a school subject. This conception includes the important and necessary academic element and often some national specificity, as well as the foundations of PE as they proved their worth in history and personal experience. On the other hand, it can also include the risk of dogmatism, a lack of understanding of the changes in the pupils life, detachment of the school from their life style, and other negative phenomena.

As a matter of fact, is this division of the content and the conception of Physical Education into traditional and modern appropriate? The traditional content in longer intervals often becomes modern again, while the recently promoted content starts to appear as obsolete.

In this context it is desirable to ask the question whether the features of the traditional or modern conception of PE, as they are commonly formulated, are true and typical, and to what degree they are controversial. See the following features of Physical Education:

National character	– European and world character
Recognised sports branch	– new non-traditional sports branch
Olympic sports branch	– non-Olympic sports branch
Sports activities based on rules	– The same activities using simplified rules
Sports activities performed	– The same activities but separately as to gender coeducational
Traditional sports activities	– The same activities modified for leisure
Traditional sports activities	– The same activities but combined (e.g. athletics and games, dance and acrobatics, etc.)

Even in PE as a school subject it is necessary to preserve the content which is relatively independent from the influence of fashion and is not subject to transitory extremist educational views. It is also a sign of firmness and stability of the subject in school curricula.

A typical example of the often discussed content of PE is its athletics (track and field) content (a similar situa-

tion is found in sports gymnastics, some traditional games, etc.). The pupils interest in athletics (in school PE) does not correspond to the popularity of athletics in the world or its rating in the school system. In the Central European region (particularly in the Czech Republic and Poland), the popularity of athletics among other sports branches, as based on a survey of 2,217 girls and 1,978 boys in elementary schools and 2,119 girls and 1337 boys in secondary schools, appears as follows:

Table 1: Girls and boys interest in athletics at elementary and secondary schools (rank of interest in relation to other sports branches)

Rank	ES girls	SS girls	ES boys	SS boys
1.	swimming	swimming	swimming	swimming
2.	dance	dance	sports games	sports games
3.	skating, roller-s.	skating, roller-s.	skating, roller-s.	skiing - downhill
4.	skiing - downhill	skiing - downhill	skiing - downhill	skating, roller-s.
5.	sports games	aerobics	hiking (cyclo-h.)	hiking (cyclo-h.)
6.	athletics + run	hiking (cyclo-h.)	athletics + run	athletics + run
7.	hiking (cyclo-h.)	sports games	skiing - run	fitness exercises
8.	aerobics	athletics + run	combative sports	skiing - run

It is shown that the principal cause of the rather small interest in athletics is not in the »out-of-date content« but its old-fashioned presentation, the concept of the tuition, the failure to adapt the teaching matter to the style of life, and other factors (Frömel, Novosad and Svozil, 1999). Thus we regard as a major problem of present-day school PE to preserve the athletics content to a corresponding extent in school curriculum's conceptions of school PE, but mainly the way of maintaining and developing athletics in school classes. Increasing attention is also due to the new didactic conceptions that are not based on sports branches (Größing, 1993; Hummel and Balz, 1955). These didactic conceptions, when misunderstood, can contribute to the departure from the typical content of school PE, although in these conceptions too, athletics and similar exercises have their own firm place.

As for all the alternative conceptions of school PE in various educational programmes, it is evident that the basic skills of the athletics subject-matter are also an integral part of the curricula. They are standards suitable for life, often also needed for preservation of life, and linked to the quality of life. They are primarily the following standard abilities:

- jumping across a barrier
- throwing an object over a certain distance or at a goal
- accelerating in a run
- running a certain distance
- feeling the satisfaction originating from a fast walk, running, jogging, either in a sports field or in open country (and other activities).

## The goal of the survey.

The goal of the survey was to make a probe into the less popular teaching matter in PE in the context of the physical load of pupils and their attitude to the subject matter. Athletics was chosen as a typical subject matter and PE teaching units as a suitable form of realization.

## Partial goals:

1. Characterise athletics teaching units from the aspect of physical load.
2. Analyse the physical load differences between boys and girls in athletics teaching units.
3. Analyse the physical load differences between boys and girls in athletics
4. Teaching units at elementary and secondary schools.
5. Analyse the relation to teaching units and assess teaching units for girls and boys in elementary and secondary schools.

## Hypotheses

Recent research points out that increased physical load in teaching units makes the girls attitude and rating of these teaching units less positive, whereas with boys it is reversed (Frömel, Garbaciak, Hórna, Kubcyk and Poczenty, 1998).

**H<sub>1</sub>** Girls with a higher physical loads in athletics teaching units rate them less positively than girls with a lower physical load.

**H<sub>2</sub>** Boys with a higher physical load in athletics teaching units rate them more positively than boys with a lower physical load.

## METHODS

The field survey took place in natural conditions in four randomly chosen elementary and two secondary schools. At the elementary level, a total of 43 girls with mean age  $14.1 \pm 0.8$  (weight  $47.5 \pm 7.8$  kg and height  $160.2 \pm 6.6$  cm), 89 boys with mean age of  $13.6 \pm 0.7$  years (weight  $52.5 \pm 11.4$  kg and height  $164.5 \pm 4.8$  kg). At the secondary level, 93 girls with mean age of  $16.3 \pm 0.6$  years (weight  $57.7 \pm 4.8$  and weight  $171.7 \pm 5.2$  cm) and 93 boys with mean age of  $15.7 \pm 0.8$  (weight  $64.7 \pm 12.6$  kg and height  $174.9 \pm 7.8$  cm). The athletics teaching units with varied content took place in proper school conditions and were taught by qualified teachers. The teachers were asked to realise the athletics content only, in a habitual form, and attempt making the teaching unit as good as possible. The final part included a relaxation exercise, followed up by the research tasks (completing the questionnai-

re and announcing the results of the monitoring). In spite of an attempt at having natural conditions, the monitored teaching units must be seen as »better«, both from the aspect of the teacher and the pupils. Besides producing typical habitual teaching units some teachers included creative and »game« episodes in the teaching units.

Before the teaching unit started, all pupils were given a sport tester (Polar), accelerometer (Caltrac) and pedometer (Omron). At the end of the teaching unit the pupils filled out a questionnaire evaluating the unit (see: Appendix). The method of the survey is fully standardised and was tested in practice in numerous international research projects (Frömel et al., 1998).

For a more profound analysis of the problem the participants were divided into classes in the stage of score processing according to the median into two groups, according to the rating of the teaching units in the questionnaire (the overall number of points) and from one more aspect, according to the energy output during the motor activity per kilogram of weight ( $\text{kcal} \cdot \text{kg}^{-1} \cdot 45 \text{ min}^{-1}$ ).

In a supporting survey, using the same method and the same questionnaire, the attitude and evaluation of athletics teaching units was diagnosed in elementary (girls  $n = 745$ , boys  $n = 671$ ) and in secondary schools (girls  $n = 191$ , boys  $n = 128$ ).

For the processing and analysis of the scores, special software was used, which makes possible a didactic service for pupils and parents (individual results), teachers and head teachers (mean, comparative, and summary results). For statistical processing the basic statistical values, non parametric tests and M - ANOVA Post Hoc Scheffe tests were used.

## RESULTS

The characteristics of the load given in Figure 1 need, however, be understood as general information on-

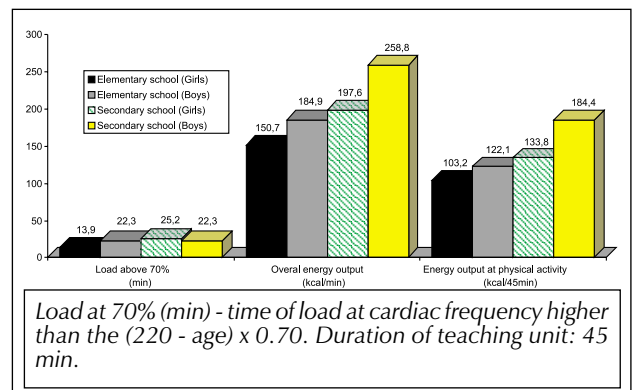


Figure 1: Physical load of girls and boys in teaching units (summary characteristics) in elementary and secondary schools

Table 2: Further characteristics of girls and boys load in athletics teaching units

Index	Girls		Boys	
	M	SD	M	SD
Intensity of physical activity – Sporttester (METs)	7.81	1.42	8.86	2.73
Intensity of physical activity- Caltrac (METs)	4.47	0.77	5.08	1.04
Energy output in physical activity (kcal)	124.12	34.80	153.94	53.63
Overall energy output (kcal)	198.79	42.62	222.71	62.87

Legend: M = arithmetic mean, SD = standard deviation

Table 3: The load of girls (n=136) and boys (n=182) in athletics teaching units at elementary and secondary schools (sport testers)

Index	Higher load (min)		Medium load (min)		Mean HR (beat · min <sup>-1</sup> )	
	M	F	M	F	M	F
Girls	6.19		18.46		145.05	
		0.75		<b>6.90</b>		2.78
Boys	5.68		16.60		143.35	
Elementary s.	4.94		18.27		143.56	
		<b>11.28</b>		<b>4.25</b>		1.26
Secondary s.	6.92		16.81		145.00	

Legend: Higher load (time of cardiac frequency above the anaerobic threshold, i.e. above  $(220 - \text{age}) \times 0.85$ ; Medium load (time of cardiac frequency in the range 70-85% of maximal HR; M = arithmetic mean; F = multivariate analysis of variance (Statistically significant values are in bold press ( $p < .05$ ))

ly, the consequence of which is that the individual scores cannot be compared. The other characteristics also document the relatively high level of the physical load in girls and boys in athletics teaching units (Table 2).

The differences in girls and boys loads in athletics teaching units (Table 3) are similar to the other types of teaching units. With girls we usually register a higher load according to the measurement of cardiac frequency, although all the other characteristics confirm a greater volume and intensity of motor activity for boys (Table 4).

We regard as essential that among the girls who rated the athletics teaching units more or less positively, no significant differences were found in the load of these teaching units (Table 5).

Similar conclusions are arrived at when the participants were divided in each athletic teaching unit according to their physical load. In the groups formed

Table 4: Load of girls (n=136) and boys (n=182) in athletics teaching units at elementary and secondary schools (accelerometers and pedometers)

Index	Energy output – Caltrac (kcal·kg <sup>-1</sup> ·45min <sup>-1</sup> )		Energy output – Omron (kcal·kg <sup>-1</sup> ·45min <sup>-1</sup> )		Steps – Omron (number)
	F	M	F	M	F
M					
Girls	2.19		1.40		2142
		35.39		39.24	45.46
Boys	2.60		1.74		2684
Elementary s.	2.20		1.48		2290
	34.25		9.36		9.29
Secondary s.	2.59		1.65		2536

Legend: Energy output- calories consumption at motor activity - without metabolism at rest  
Steps = number of steps includes skips and position changes,  
M = arithmetic mean,  
F = multivariate analysis of variance (Statistically significant values are in bold press ( $p < .05$ ))

Table 5: Relation between different ratings of teaching units and the physical load of the participants in athletics teaching units

Teaching unit rating	Higher load (min)		Mean SF (beat · min <sup>-1</sup> )		Energy output (kcal·kg <sup>-1</sup> ·45min <sup>-1</sup> )		Steps (number)
	F	M	F	M	F	M	F
M							
Better – Girls	5.93		145.32		2.32		2266
		0.00		0.00		3.63	2.06
Worse – Girls	5.94		145.41		2.16		2131
Better – Boys	5.75		143.78		2.65		2712
		0.24		0.47		1.06	0.28
Worse – Boys	5.63		142.64		2.55		2651

Legend: Higher load (time of cardiac frequency above the anaerobic threshold, i.e. above  $(220 - \text{age}) \times 0.85$ ); Energy output (calories consumption at motor activity - without metabolism at rest), Steps = number of steps includes skips and position changes, M = arithmetic mean, F = multivariate analysis of variance (Statistically significant values are in bold press ( $p < .05$ ))

in this way, no significant differences in the rating of teaching units was found either (Table 6). Hypotheses H1 and H2 were not confirmed.

The scores from the supplementary surveys confirm that like in other teaching units, athletics teaching units are rated more positively by girls than by boys, both at elementary and secondary schools (Table 7). Table 7.

Table 6: Relation between the different physical load of each participant and their ratings of athletics teaching units

Index	Relation		Overall rating		Pupil's role	
	M	F	M	F	M	F
Higher load - Girls	3.37		16.28		4.35	
	0.64		1.31		0.97	
Lower load - Girls	3.24		16.94		4.60	
Higher load - Boys	3.07		15.75		4.36	
	0.09		0.48		3.47	
Lower load - Boys	3.09		16.18		4.81	

Legend: Relation = point rating in the relational dimension of the questionnaire, Pupil's role = point rating in the supplementary dimension of the questionnaire, M = arithmetic mean, F = multivariate analysis of variance (Statistically significant values are in bold press ( $p < .05$ ))

Table 7: Rating of athletics teaching units in Physical Education at elementary (girls  $n=745$ , boys  $n=671$ ) and secondary schools (girls  $n=191$ , boys  $n=128$ )

Dimension	Teaching units	Elementary schools			Secondary schools		
		Points	%	t	Points	%	t
I. cognitive	Girls	1968	66	0.48	474	62	<b>2.16</b>
	Boys	2020	66		329	65	
II. emotive	Girls	2296	77	1.76	622	81	<b>2.54</b>
	Boys	2020	75		382	76	
III. health (fitness)	Girls	2019	68	1.79	530	69	0.76
	Boys	1763	66		322	64	
IV. social	Girls	1721	58	<b>3.56</b>	462	61	1.28
	Boys	1428	53		265	53	
V. relational	Girls	2156	73	1.37	586	77	<b>2.32</b>
	Boys	1903	71		341	68	
VI. creative	Girls	1932	65	1.25	534	70	<b>2.54</b>
	Boys	1787	67		308	61	
I.-VI. Total	Girls	12092	68	<b>3.16</b>	3208	70	<b>2.82</b>
	Boys	10660	66		1947	64	
Pupils role	Girls	3617	61	1.23	919	60	0.51
	Boys	3172	59		555	55	

Legend: t - test of the difference between two relative values  
Statistically significant values are in bold press ( $p < .05$ )  
Individual dimensions are given in the questionnaire (see Appendix).

## DISCUSSION

The findings confirmed our hypothesis, that in monitored athletics teaching units the physical load in girls and boys would be on a good level. The mean intensity of the physical load corresponds, in harmony with the compendium (Ainsworth et al., 1993), with the values of a run at the speed of 12 minutes per mile. The values of the intensity of motor activity registered with ac-

celerometers are substantially lower than the values established by sport testers, but agree with the usual difference between the two methods of measurement.

The main cause of the differences in scores shown by sport testers on one hand and accelerometers and pedometers on the other is seen, in the girls higher cardiac frequencies when at rest, a stronger response to the load due to the level of fitness, emotive influences and undoubtedly some other factors. The energy output per kilogram of weight measured by the pedometer is supplementary only. When the pedometer measures the energy output, it is less accurate than the accelerometer and without adaptations of the resulting values by the transfer coefficient it presents a 30-40% lower energy output in calories.

The differences in the pupils load in teaching units at elementary and secondary schools cannot be generalised and should be taken as informative only.

In the context with our earlier surveys and our experience the following hypothesis is possible. If in general girls rate their teaching units lower as the load increases, then the significant differences not found in the physical load of girls with different rating of teaching units signalise that the didactic process respected the girls individuality and enabled to some degree an individualisation of the volume and intensity of their motor activity. That is probably also one of the suitable ways towards a greater quality of athletics teaching units.

Similar findings come from equally formed groups of boys, even though their mostly higher load does not lead to a worse rating of their teaching units, on the contrary.

However, compared to most athletics teaching units, (with games, gymnastics, dance, etc.) less positively (Frömel, Novosad and Svozil, 1999). Partial responses to the questions in the questionnaire show that the situation for athletics teaching units need not be so critical as is generally said in school practice. E.g. only 33% girls and 38% boys would have gone home if they could have done so and for only 32% of girls and 38% boys a separate, out-of-school exercise was regarded to be better than the athletics teaching unit they attended.

## CONCLUSIONS

Popularity of a sport need not be the main factor affecting the rating of the teaching unit. Unless the girls and boys have a completely negative attitude to the content, the concept and presentation of the content are of greater importance for the efficacy of the teaching units.

Athletics teaching units can even now and in the present-day conception of school PE be an efficient stimulus for adaptation. The physical load of girls and boys in

athletics teaching units can meet even more demanding requirements.

The difference in load between the participants in athletics teaching units failed to affect the negative rating of the teaching units. In contrast, among the participants evaluating the teaching units in positive and less positive ways, no difference was found in their physical load in the teaching units.

The application of athletics in school PE demands completely new approaches, emphasising the playfulness, joyfulness, satisfaction in physical activity, satisfaction derived from the learning, a new conception of competitiveness, while the adequate physical load is preserved, particularly in boy classes.

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## Appendix Questionnaire (pupils' relation to PE lesson)

School, form, sex, date:

	(sign X)	YES	NO
1. Could you identify the aim of the lesson and what the teacher was attempting to do?			
2. Was the physical activity satisfying?			
3. Were you relaxed after the class?			
4. Did you see the teacher as an adviser or friend?			
5. Would you like to have the same or a similar class next time?			
6. Did you have the chance to solve a problem on your own?			
7. Did you learn anything new?			
8. Was there a good feeling about the class?			
9. Was there a good feeling after the class?			
10. Were your schoolmates naughty during the class?			
11. Would an extracurricular activity be better than participating in this class?			
12. Did you have a chance to make a decision in the class to do something on your own and in your own way?			
13. Did you learn any new skills or improve old ones?			
14. Was the class fun?			
15. Do you think that the class improved your fitness?			
16. Did you ask any questions during the class?			
17. I would have preferred attending another class.			
18. Did you feel that you were always directed by the teacher?			
19. Did you give any demonstration in the lesson?			
20. Did the teacher or a classmate praise you?			
21. Did you think about your posture during the lesson? Did you do any stretching?			
22. Did you correct any mistake made by your classmate or did a classmate correct your mistake?			
23. If you had been allowed to leave the class and go home, would you have done so?			
24. Were there any surprises or new things in the class?			

## Questionnaire structure

The questionnaire contains 24 questions classified into six dimensions and one supplementary dimension.

Dimensions	Questions No.
I Educational	1, 7, 13, 19,
II Emotive	2, 8, 14, 20,
III Health (fitness)	3, 9, 15, 21,
IV Social (interaction)	4, 10, 16, 22,
V Relational	5, 11, 17, 23,
VI Creative	6, 12, 18, 24,
Supplementary dimensions	
VII Pupil's role	2, 4, 6, 12, 16, 18, 19, 22