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The efficacy of classic and direct methodical practice partial differences analysis in alpine skiing learning

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Abstract

The problem of research in this scientific paper is based on determining which method of teaching the elements of alpine skiing, with students from 19 to 21 years of age, is more efficient on grounds of two different approaches to the methodology of ski beginners training.

The "classic approach" or the "traditional method" of learning how to ski presents the manner of skiing through particular phases. Such manner of training has a long-standing history and it proved as an efficient manner for bringing the skiing closer to beginners. A "direct approach" to the alpine ski training can refer to any training not including plough or V- position of ski technique.

Based on presented results of arithmetic means of sub-samples from the set of variables with grades of skiing techniques of the group that was taught alpine skiing using the „classic" method, and the set of variables referring to the grades of the group taught by "direct" method, based on the significance of differences tested under the T-test, significant partial differences can be identified for the given parameters contributing to set hypotheses on qualitative differences expressed through medium values of single assessed ski techniques. Research results have contributed to the thesis that a "direct" methodical approach is more efficient in alpine skiing teaching students than the „classic" methodical sequence in the ski training.

Keywords: **alpine skiing, direct approach**

Introduction

Skiing is one of the most useful activities for the man's health. Spending time on snow is a continuous movement. In addition to effects of the winter itself, the influence of winter activities on organism is especially highlighted. Cold, wind and other characteristics have a useful impact on organism and its resilience. Spending time at skiing resorts opens the possibility that one encounters various situations, when he/she must react quickly, think and cope with space and time and to protect oneself or to learn in motor manner (Nurković, N. 2003.).

The "classic approach" or the "traditional method" of learning how to ski presents the manner of skiing through different phases. Such manner of training has a long-standing history and it proved as efficient manner for bringing the skiing closer to beginners. From the first use of skies as a transport until today, there were different ways of using skies that are referred to as skiing techniques. Skiing techniques themselves are closely related to the equipment for alpine skiing whose changes enabled a continuous growth of new and improvement of the existing skiing techniques. One of skiing techniques that was present throughout the history of alpine skiing, from the very beginnings until today, is the plough skiing technique or the V-shape technique. That skiing technique is often used today in alpine skiing by beginners, who are only making a balanced position on skies (Matković, B.

and others). In addition to skiing techniques and it is also used by touring skiers who are descending using skies outside arranged ski terrains, whereby they encounter obstacles such as rocks, plants or cracks in the snow and ice. Therefore, in order to have a safe descending from the mountain, they use elements of the plough technique of alpine skiing. Similar to that, plough or V-shape skiing technique is also used by Mountain Rescue Services who are descending the hill under load when transporting injured skiers. Plough position of skies enables a safe balanced position and the control of speed in which the front part of skies (tips) is put together and the back part (tails) is spread.

Such position of skies with a continuous and instant pressure of both knees forward and inside causes skies into position of edging which enables the skier a safe and controlled descending down the slope. Due to aforementioned characteristics, such skiing technique is traditionally applied during the beginning phases of ski teaching. The lack of plough skiing technique is the fact that a long-term position in the plough position for the skiers presents the pressure for ankles and muscles of lower body extremities. Moreover, using that skiing technique, it is not possible to dynamically overcome the ski trail, and after learning how to ski in such manner, beginners still have the remains of the plough position in parallel curves.

By going to a winter skiing resort outside the place of residence and by doing various physical activities in a group, it is unavoidable to meet new people, and thereby, to make mutual bonding which influences the sociological component. Great number of recreational skiers and the growing interest for the alpine skiing today had a definite impact on organization and manner of teaching. The life tempo and growing obligations of the present lifestyle led to a decreasing amount of free time, and as a consequence, there is a need for more efficient utilisation of each free day. Alpine skiing schools or their programmes had to adjust to such trend, which are today mostly organized for 6 or 7 days, within which beginners learn new and motor activities. Ski schools today mostly create their offer on the basis of seven-day students' winter trip, and skiing resorts themselves, offering various activities and programmes and the possibility of renting the equipment, mostly organize their offer to the period of seven days. Such lifestyle and the very offer affected changes in the present manner of ski training. A "direct" approach of alpine ski training can be considered any training which does not include plough or "V- position" skiing techniques.

The main aim of research in this scientific paper is based on determining which method of teaching the elements of alpine skiing with students from 19 to 21 years of age, is more efficient on the basis of two different approaches to the methodology of ski beginners training.

The research was based on the research of the following authors: Žvan, M., Agrež, E., Berčić, H., Dvoršak, M., Lešnik, B. and others. (1998), in the book "*Alpsko smučanje, staudijsko gradivo*" state that the lack of plough skiing technique is that a long-term position in a plough position represents difficulty for the skier for ankles and muscles of lower extremities. Moreover, using that skiing technique, it is not possible to dynamically ski down the hill.

Cigrovski, V. (2007) in his paper "*Effectiveness of different methods in the process of learning the skiing knowledge",* shows the research that was done on the sample of 126 beginners which indicate how a more efficient manner of teaching alpine skiing is the one which uses elements of plough technique of alpine skiing in its programme. Namely, after performed research with skiing beginners, it was determined how the programme of learning alpine skiing in which elements of the plough alpine skiing techniques are left out presents a deficiency and not advantage in the end. Different programmes of teaching alpine skiing should enable recreative skiers up to the level that they can use more advanced elements of the skiing technique, but in the beginning phases of learning, plough skiing technique elements are in the function of better improvement and it is not the phase that should be left out. Moreover, it is not necessary to force elements of plough alpine skiing technique, but ski trainers, after their students acquired the elements of aforementioned technique during their training, should continue with more advanced elements of the skiing school, that is, elements belonging to a parallel skiing technique.

Sekulić, D., Rausavljević, N. (2006), in their research "*Analysis of methodical procedure of specific visualisation in the ski training*", state researches who studied the alpine skiing learning process from different aspects which were also organized on the principle of six-day or seven-day alpine ski learning process. Authors concluded that in the perspective of developing the school of alpine skiing, it is necessary to take good care on the client's desire for a more efficient alpine ski school and desire of the teacher to transfer as much knowledge on alpine skiing as possible in scheduled period.

Murovec, S. (2006), in his book "*Na kanto!:UPS-učenje s podaljševanjem smuči*", indicates one model of approaching the learning which during the process of teaching beginners, each several days, it demands the change of skies length on which beginners are being taught. In that manner, first steps on the snow are acquired on extremely short skies of 90 centimetres length, then the skiers take skies of 125 centimetres length, and at the end of the teaching process, they choose skies for their morphological characteristics or desires of skiers themselves. Such approach of teaching completely leaves out the elements of the plough or V-shape skiing technique.

Lešnik, B., Murovec, S., Gašperšić, B. (2002), in the book „*Opredelitev oblik drsenja in Smučanja*", state that the so-called V-shape skies position is often used today as a transfer phase between the elements of the plough and parallel skiing technique where the frontal part of skies is put significantly closer in relation to the plough position. By using the "V" skies position in the learning process, whether as a methodical exercise or as the element of the skiing technique, the preparation for making the turn completely using the parallel skiing techniques is done gradually.

Methods

Methods in research are based on quantification of learning process phenomena in alpine skiing. This scientific paper is based on determining which method of teaching the elements of alpine skiing is better, with students from 19 to 21 years of age a 55 of them in same academic year of study at the Faculty of Sport and Physical Education in Sarajevo.

Research variables used in this paper are: KLIND ("V" position skis turns, direct way of learning), OSZAVD (basic alpine skiing turn, direct way of learning), ZAKBRD (parallel turning in hill way, direct way of learning) , SIPAVD (parallel turnings in wide course, direct way of learning), KLINKL ("V" position skis turns, classic way of learning), OSZAVKL(basic alpine skiing turn, classic way of learning), ZAKBRKL(parallel turning in hill way, classic way of learning), SIPAVKL(parallel turnings in wide course, classic way of learning).

Data processing methods

In this paper, data processing method is on invariant level with basic statistical parameters obtained from created matrixes.

Descriptive statistics offers basic data on the phenomenon of valorised result in terms of grades describing the quality of performing alpine skiing techniques. Data in tables of basic statistical parameters are presented separately for the two groups of examinees, that is, their results. By comparing and controlling obtained parameters, previously set assumptions were explained with analysed differences in assessed segments.

T-test method shall provide data on statistical significance of partial differences based on assessed alpine skiing techniques.

Results and Discussion

After processing results and creating matrixes with data on assessed alpine skiing techniques, basic statistical parameters referring to studies phenomenon in the research were calculated.

Table 1. Descriptive statistical data

	val. N	Mean	Median	Sum	Minimum	Maximum	Std.Dev.	Standard Error	Skew.	Kurtosis
KLIND	55	6,37272	6,00000	350,500	5,500000	10,00000	0,77709	0,104783	2,377845	8,119726
OSZAVD	55	6,38181	6,00000	351,000	5,000000	10,00000	0,94752	0,127765	1,980118	3,916598
ZAKBRD	55	6,77272	6,50000	372,500	5,500000	10,00000	1,01296	0,136588	1,137987	1,188519
SIPAVD	55	7,10000	7,00000	390,500	5,500000	10,00000	0,89958	0,121300	0,777668	1,720879
KLINKL	55	6,66363	6,50000	366,500	5,500000	8,50000	0,70088	0,094508	0,682972	-0,349322
OSZAVK	55	6,65454	6,50000	366,000	6,000000	8,00000	0,71279	0,096114	0,780109	-0,637894
ZAKBRK	55	6,20909	6,00000	341,500	6,000000	8,00000	0,41601	0,056095	2,271521	5,645072
SIPAVKL	55	6,29090	6,00000	346,000	5,500000	8,00000	0,60622	0,081743	1,580762	1,396536

Table 1 provides data on the medium value of grades for the two groups of examinees with supporting parameters which include: Median, Sum, Min and Max, Stand. Deviation and errors, and Skew and Kurtosis of results distribution. Differences in medium values of variables referring to grades for the group which learned to ski according to "direct" method in relation to the group who learned to ski according to "classic" methodical procedures of alpine ski training, are visible, and their values go in favour of expectations in this paper.

Medium values of the results describing grades from technical elements show visible differences in the level of grades for the variables describing skiing elements where V-position techniques and ploughing are used. Variables KLIND and OSZAVD have less values than KLINKL and OSZAVKL variables, therefore, variables with grades of a direct approach of skiers' training where skiing elements of plough and V-position turnings were not applied, had weaker results for aforementioned techniques.

Medium values of results assessing skiing techniques with parallel set skies, such as the curve towards the hill (ZAKBRD) and broad parallel wriggling (SIPAVD), trained according to direct approach with medium grades 6.772 and 7.100, show even better results in relation to variables ZAKBRKL and SIPAVKL describing the grades for the group of students who learned to ski according to the classic manner of training for beginners. If it is taken into consideration that students were divided into relatively heterogeneous groups according to the level of alpine skiing knowledge, then given results go more in favour of the hypothesis which states: It is expected that skiers who used a "direct" methodical sequence highlighting the technique curve towards the hill and broad parallel wriggling, would adopt the target technique in faster and efficient manner and have better results when making parallel skiing techniques. When the total value of grades is summed up for the group that was trained according to direct approach, the sum of 1.465.50 is obtained and it is bigger in relation to the sum of grades for the group using the "classic" approach (1.420.00) and methodical procedures for training beginners with phases of ploughing or V-position curves or turnings. Such result goes in favour of the hypothesis claiming that it is expected that the group who did the training using "direct approach" achieves better results in the final testing than the group who did the training using the "classic approach".

The analysis of partial quantitative differences in the level of students' grades, T-test

In order to determine partial quantitative differences of medium value of grades achieved by the students from the group that was taught alpine skiing using the "classic" method and the group that was taught by "direct" method, the analysis of results using the T-test was applied.

Based on presented results of arithmetic means of sub-samples from the set of variables with grades of skiing techniques of the group that was taught alpine skiing using the "classic" method and the set of variables referring to grades of the group that was taught using "direct" method, based on the significance of differences (Sig) tested under the T-test, it can be determined that there are partial differences for the given parameters going in favour of set hypotheses on qualitative differences expressed through medium values of especially assessed skiing techniques. Values of the T-test were significant on the level (Sig p= or < 0.05).

By examining Table 2 with results of analyses of partial quantified differences based on the T-test, it is noticeable that there are statistically significant differences of medium values of assessed techniques for two differently trained groups of students.

In relation to the variable KLINKL, variable KLIND has less value expressed in the difference of -0.2909 which goes in favour of the hypothesis which states: It is expected that skiers who used a "classic" methodical sequence, including the ploughing and basic curve, would have better results when using ploughing techniques in alpine skiing. Of course, V-shaped curve in its root has a plough position that was avoided in a direct manner of learning to ski from the reason that "remains" of ploughing are preferred to be avoided in target skiing techniques represented by parallel curves with different speed, rhythm and their radius.

Curve towards the hill was assessed also as one of important elements in training of beginners. Values of given techniques are expressed with variables ZAKBRD and ZAKBRKL. Since this is the case of parallel technique, medium values of grades are higher for the variable ZAKBRD and they amount 6.772 in relation to the lower value of variable ZAKBRKL with the value 6.209. Such result of the T-test indicates statistically significant difference with

the coefficient value p= 0.000. The following hypotheses can be concluded from the aforementioned: It is expected that skiers who used a "direct" methodical sequence highlighting the technique curve towards the hill and broad parallel wriggling, would adopt the target technique in faster and efficient manner and have better results when making parallel skiing techniques.

Relations between quantitative and partial differences, which are relevant for this paper, were extracted from Table 2 in medium values of variable SIPAVD (broad parallel wriggling trained by "direct" approach) and SIPAVKL (broad parallel wriggling trained by

"classic" approach). There is a significant difference in the value of aforementioned medium grades with the value of 0.809 and coefficient of p= 0.000. Such big difference that goes in favour of the grade expressed by variable SIPAVD confirms assumptions of the general hypothesis presuming that it is expected that the group who did the training using "direct" approach would have better results on the final testing than the group who did the training using "classic" approach, or hypothesis which states: It is expected that skiers who used the "classic" methodical sequence including the ploughing and basic curve will have worse final results when performing parallel ski turning techniques.

Table 2. *T-test for Dependent Samples*

	Mean	Std.Dv.	N	Diff.	Std.Dv. - Diff.	t	df	p
KLIND	6,372727	0,777092						
KLINKL	6,663636	0,700889	55	-0,290909	1,061493	-2,03246	54	0,047038
KLIND	6,372727	0,777092						
OSZAVKL	6,654545	0,712798	55	-0,281818	1,096136	-1,90671	54	0,061884
KLIND	6,372727	0,777092						
ZAKBRKL	6,209091	0,416010	55	0,163636	0,908063	1,33643	54	0,187014
KLIND	6,372727	0,777092						
SIPAVKL	6,290909	0,606225	55	0,081818	1,017275	0,59648	54	0,553350
OSZAVD	6,381818	0,947529						
KLINKL	6,663636	0,700889	55	-0,281818	1,246341	-1,67692	54	0,099338
OSZAVD	6,381818	0,947529						
OSZAVKL	6,654545	0,712798	55	-0,272727	1,165945	-1,73473	54	0,088494
OSZAVD	6,381818	0,947529						
ZAKBRKL	6,209091	0,416010	55	0,172727	1,110631	1,15338	54	0,253834
OSZAVD	6,381818	0,947529						
SIPAVKL	6,290909	0,606225	55	0,090909	1,142977	0,58986	54	0,557743
ZAKBRD	6,772727	1,012963						
KLINKL	6,663636	0,700889	55	0,109091	1,311244	0,61700	54	0,539826
ZAKBRD	6,772727	1,012963						
OSZAVKL	6,654545	0,712798	55	0,118182	1,228382	0,71351	54	0,478604
ZAKBRD	6,772727	1,012963						
ZAKBRKL	6,209091	0,416010	55	0,563636	1,130612	3,69715	54	0,000511
ZAKBRD	6,772727	1,012963						
SIPAVKL	6,290909	0,606225	55	0,481818	1,197852	2,98306	54	0,004277
SIPAVD	7,100000	0,899588						
KLINKL	6,663636	0,700889	55	0,436364	1,190450	2,71843	54	0,008800
SIPAVD	7,100000	0,899588						
OSZAVKL	6,654545	0,712798	55	0,445455	1,165367	2,83480	54	0,006439
SIPAVD	7,100000	0,899588						
ZAKBRKL	6,209091	0,416010	55	0,890909	1,034994	6,38377	54	0,000000
SIPAVD	7,100000	0,899588						
SIPAVKL	6,290909	0,606225	55	0,809091	1,132397	5,29883	54	0,000002

*Analysis of partial quantitative differences **(T-test)***

In general, top competitors or technical innovative individuals, wanting to have a more efficient manner of skiing, anticipated changes in the history of alpine skiing. In case of technique on "structured" skies with decreased lateral radius, there were changes in terms of innovation in the skies development and production. No individual or competitor but the professional expert team has dominantly changed the «skiing environment»! (Žvan,M. and others 1998) It was necessary to find the new, efficient and functional manner of skiing or the new technique. Ever since then up to the present, there were attempts in finding an efficient, quality technique acceptable for the skier, as well as method of ski training.

The responsibility of ski instructors was never significant and sensitive in such manner before. Good knowledge of the technique and method of skiing by present ski instructors demands a sensitive and responsible application in the education process. It is highly important to know and to feel where the student's position in terms of skiing knowledge, what is his/her knowledge, what he/she does not know and how he/she can use it further.

The basic idea of research in this paper is based on determining which method of teaching the elements of alpine skiing with students of the second year of the Faculty of Sport is more efficient on the basis of two different approaches to the methodology of training ski beginners.

Conclusion

Based on obtained results, the relevant conclusions were also obtained contributing to set hypotheses in this sci. paper.

Differences in medium values of variables indicating the grades for the group who learned how to ski using "direct" method in relation to the group who learned how to ski using "classic" methodical procedures of alpine skiing training, are visible, and its values also go in favour of set hypothetic assumptions.

When the total value of grades is summed up for the group that was taught using the direct approach, we get the sum of 1,465.50 which is higher than the sum of grades for the group that used the "classic" approach (1.420.00) and methodical procedures of ski training of beginners with phases of ploughing or V-position of skies curves, the result goes in favour of the hypothesis claiming that it is expected that the group who did the training using "direct approach" achieves much better results on the final testing than the group who did the training using "classic approach".

Relations of quantitative, partial differences that are relevant in this paper with medium values of variables SIPAVD (broad, parallel wriggling trained with "direct" approach) and SIPAVKL (broad, parallel wriggling trained with "classic" approach) indicate a significant difference of aforementioned medium grades with value of 0,809 and coefficient p= 0.000. Such important difference in favour of assessment expressed with the variable SIPAVD confirms hypothetic assumptions which presupposes that it is expected that the group who did the training using "direct" approach achieves better results on the final testing than the group who did the training using "classic" approach or the hypothesis which reads: It is expected that skiers who used the "classic" methodical sequence including the ploughing and basic curve will have worse final results when making parallel skiing turn techniques.

Medium values of results who assess ski techniques with parallel set skies, such as curve towards the hill (ZAKBRD) and broad parallel wriggling (SIPAVD), trained according to direct approach with medium grades 6.772 and 7.100, show better results in relation to variables ZAKBRKL and SIPAVKL describing grades for the group of students who learned how to ski according to the classic approach f training ski beginners. If you take into consideration that students were divided in relatively heterogeneous groups according to the knowledge level of alpine skiing, then given results go in favour of the hypothesis which states: it is expected that skiers who used a "direct" methodical sequence highlighting the technique curve towards the hill and broad parallel wriggling, would adopt the target technique in faster and efficient manner and have better results when making parallel skiing techniques.

Variable KLIND, in relation to the KLINKL variable, has less value expressed in the difference of -0.2909 which goes in favour of the hypothesis stating: It is expected that skiers who used the "classic" methodical sequence including the ploughing and basic curve will have better final results when performing plough techniques in alpine skiing. Of course, V-position of skies curve in its root has a plough position that was avoided in a direct manner of learning to ski from the reason that "remains" of ploughing are preferred to be avoided in target skiing techniques represented by parallel curves with different speed, rhythm and their radius. The present researches indicate that skiers who learned how to ski using the "classic" method of skiing schools often show "remains" of ploughing or V-position of skies in some parts of skiing turns which should be completely parallel. (Kovač, S. 2003.) At the end of the research, it must be indicated that according to obtained total results, it is applicable to use a "direct" manner of training beginners, if there are conditions or suitable area for such method in the skiing resort where the training is held.

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