RELATION BETWEEN SKI TECHNIQUE AND THE TIME ACHIEVED IN GIANT SLALOM

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Abstract

The subject of the paper is skiing. Problem i.e. the objective of the paper is to determine causal-effect link between the final evaluation of practical teaching in skiing as a synonym for skiing technique with the time achieved during competition in shortened giant slalom. The sample of respondents is represented by 40 third-year students of the Faculty of Physical Education and Sports from Banja Luka. These are the students who, in compliance with applicable curriculum, passed two courses of skiing. In entire procedure two variables were recorded. - The final evaluation of the practical part of skiing was formed on the basis of nine ski techniques that students have practiced throughout the course. The final evaluation essentially represents ski technique. - Second variable was related to the time achieved during short giant slalom. Based on the obtained results we can conclude there is a casual connection between the ski technique and the time achieved during the competition in shortened GS. Given statement is confirmed by correlation coefficient r= -.65 and determination r2= .42. Linear function result= 27,868-1.464 * evaluation, apropos evaluation = 12.432-0.289 * result provide good criteria prediction. Correlation and regression coefficients are statistically significant at level p < .01.

Key words: *skiing, technique, evaluation, competition, giant slalom, correlation, prediction*

Introduction

Empirical data confirms that results in sports are associated with the technique of that certain sport. If this was not the fact it would be pointless to spend hours, days and years to master the technique. Technique measuring comes down to evaluation and measuring success in skiing is measured by the time achieved in training or competition. According to its definition, evaluation is a subjective opinion of its assessor. To avoid subjectivity and increase objectivity in sports where the result in not exactly measurable with meter, scale, stopwatch, etc. as a rule there must be three or more assessors. In this paper we talk about ski technique that faculty of sport students acquire through their practical training on two courses which last for 10 days each. The program of practical training on the first course refers to the introduction of elementary techniques starting with walking on skis, turning on the spot, falling and getting up and further to the basic techniques of turning towards the slope and away from the slope. The second course is more demanding regarding the complexity of the ski technique. The program applies to skiing on groomed and ungroomed terrain, skiing in deep snow, bumps, etc. Special attention is given to techniques of wider curves known as giant slalom turn. Following gradualism from the easier to more difficult according to the rule, training technique begins with plow techniques like plow transgression, transgression parallel, scissoring transgression and ends with carving turn. Carving turn is a ski technique that emerged with carving ski. This technique has become the standard for competitors of all ages and all levels from amateurs to professionals. Carving technique is especiallz applicable for medium and long turns, so it is extremely effective in disciplines like giant slalom, super G and downhill.

The main reason for applying some technique is effectiveness i.e. sport result. Therefore, technique in skiing and other sports serves as a function of sports result.

Subject, problem and objective

According to the title, the subject of this paper is skiing. Problem i.e. the objective of the paper is to determine causal-effect link between the final evaluation of practical teaching in skiing as a synonym for skiing technique with the time achieved during competition in short giant slalom.

Sample of respondents and variables

The sample of respondents is represented by third-year student of the Faculty of Physical Education and Sports from Banja Luka. These are the students who, in compliance with applicable curriculum, passed two courses of skiing. According to the records, the course attended 40 students of both genders. Groups were formed according to the principle of previously achieved results in the first course. The intention was to form as much homogenous groups, in order for the effects of training to be higher. There were 10 students per group. In entire procedure two variables were recorded: - The final evaluation of the practical part of skiing was formed on the basis of nine ski techniques that students have practiced throughout the course. The final evaluation essentially represents ski technique and - Second variable was related to the time achieved during short giant slalom. Empirical data confirms that the giant slalom turns are extremely effective in the process of training skiers, especially beginners. It is medium and long turns that allow better control of skis, better stability and easier and faster mastering the slopes.

A particular problem for beginners is rapid transfer of weight from one ski to another, this moment is considerably longer, slower and more gradual in giant slalom comparing to slalom turn, which among other things is advantage, especially for beginners. From technical aspect, Alpine discipline giant slalom is extremely demanding technique that combines technical elements of slalom and downhill which makes this discipline attractive for the audience and the skiers as well. Giant is a subtle technical discipline, which consists of combination of long, medium and short turns. Giant slalom runs are about three times longer that the slalom, which averages out to 1700 meters. Altitude difference is 300-600 meters. At the Olympics and world championships for men seniors, altitude difference is 300-450 meters and for women 300-400 meters. In the World Cup giant slalom runs are longer and with greater altitude difference, even up to 600 meters. The minimum run width is 30 meters. There are about two times less gates than in the slalom, which, with bigger altitude difference and three times the length, allows much greater speed. Giant slalom gates are placed alternately blue and red. Each gate consists of four poles. Poles are placed in pairs as shown on image and connected with a flag of the same color as the poles (*image 1.*)

Hypothesis
Considering the previous, at least to us available literature we did not find that someone determined the cause-effect relationship between technique and results in skiing, so the null hypothesis was set.

Methodology of evaluation and measuring

Practical teachers of skiing are assistants at the Faculty of Sports with years of experience in running courses in mentioned subject. The teaching program is unique, which is familiar fact for the teachers and students as well. The training methodology is also known to the details and coordinated among the teachers. - The final evaluation of practical part is obtained after displaying 9 ski characters. The evaluation is coordinated on all teachers' level and represents level of ski technique variable. - Short giant slalom is set on a relatively mild and well prepared slope. Giant slalom is set in accordance with the technical and physical skills of students. Run length was about 500 m with 17 gates. Timekeeping was electronic; it is a professional system and software according to the FIS rules. Ski course was held on Pohorje Mountain. Ski resort was well prepared during the course and competition, nothing worse comparing to the competition in the World Cup (Golden Fox).

Discussion and conclusions based on statistical indicators

The response to this hypothesis was explicated on the basis of indicators in tables (1, 2 and 3). The above testing or field experiment suggests quite

reliable conclusion that there is a correlation (causation) between the assessment of technical knowledge of skiing with the time achieved in the competition in short giant slalom. Values in Table 1 indicate that Pearson's correlation and determination coefficient between the final evaluation and the time in a short giant slalom r - .65 and r^2 .42. Other parameters in the table i.e. corrected coefficient of determination and standard regression error confirm that null hypothesis can be rejected with an error less than 1%. The values in Tables 2 and 3 indicate the size i.e. the proportion of unexplained, explained and total variance. Table 3 presents non standardized regression coefficients. In the example of independent variable the final evaluation of the practical part of skiing was substitution for skiing technique. Dependent variable was related to the time achieved in short giant slalom. Based on the regression values, i.e. linear function it is possible to estimate the time in a shortened GS based on the actual or presumed evaluation from skiing and vice versa.

$$result = 27.868-1.464 * evaluation$$
$$evalutation = 12.432-0.289 * result$$

Table 1. Sumary regression model

	- 0.65
R	
R Square	0.42
Adjusted R Square	0.41
Std. Error of the Estimate	1.34

Table 2. ANOVA of regresion

Model	Regression	Residual	Total
Sum of Squares	51.36	69.93	121.28
df	1	39	40
Mean Square	51.36	1.79	
F	28.64		
Sig.	0.00		

Table 3. Regression coefficients and their significance

Model		(Constant)	evaluation
Non standardized Coefficients	B	27.87	-1.46
	Std. Error	2.09	0.27
Sig.		0.00	0.00

It is certainly possible to replace the roles of variables i.e. that independent (*predictor*) variable is the time achieved in short GS and dependent (*criteria*) variable is an evaluation from skiing.

Non standardized regression coefficient *B* equals – 1.464 and is statistically very significant p<, 00. The negative sign of the correlation and regression coefficients is caused by the opposite direction of variables. Namely more time in GS implies bad results, i.e. higher evaluation of ski technique implies a better result.

Technique evaluation regression to the result in GS

Chart 1 presents the interpolation of the regression line and the size of the residual zone in the range of 95% security. Yet the chart would be much better if the final evaluations are not rounded off to a whole number. So in some future experiment, this methodological deficiency is easy to overcome, which would contribute to an even greater correlation and regression coefficient. For the uniformed about this sport, the size of interdependence between these two variables might be a surprise. For those more familiar with alpine skiing, primarily for the teachers and instructors, the results are not surprising. Hypothetically, perhaps the correlation between these variables is lower in elite skiers. Certainly we talk about hypothesis which would be interesting to check in a similar way.
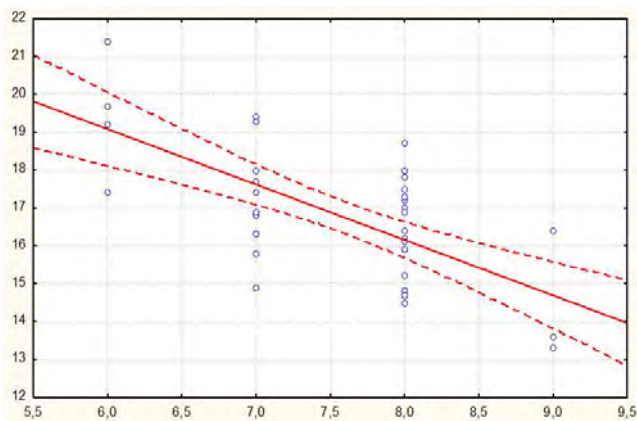

Chart 1. interpolation of the regression line
(abscise->marks, ordinate->time; result=27.868 – 1.464 * mark)

Chart 2 and 3 presents the distribution of the time achieved on short GS and the distribution of obtained evaluations in the practical part of the exam. Normality of distributions was tested by Kolmogorov Smirnov test. Visually and quantitatively, normal distribution has exam evaluation variable.

Instead of a Conclusion

This field experiment suggests quite reliable conclusion that there is a correlation (causation) between evaluations of technical knowledge of skiing with the time achieved during competition in short GS. Coefficients obtained are statistically significant with probability of error less than 1%. We should differentiate the size of the correlation and the probability of error, hence probability of error is less than 1% and the correlation coefficient r = .65 belongs to the category of medium-high i.e. high correlation.
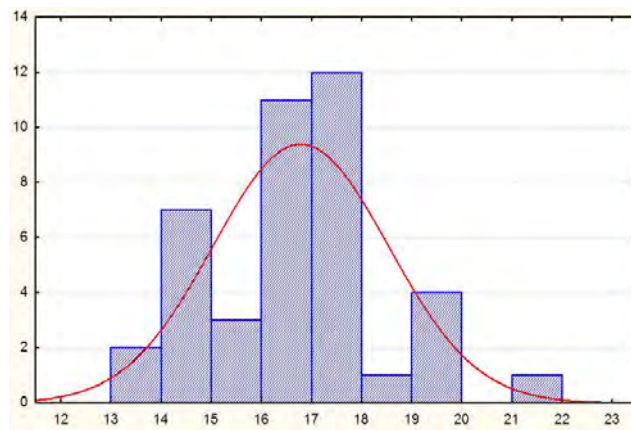

Chart 2. Time distribution of short GS competition
(abscise->time, ordinate->cases;
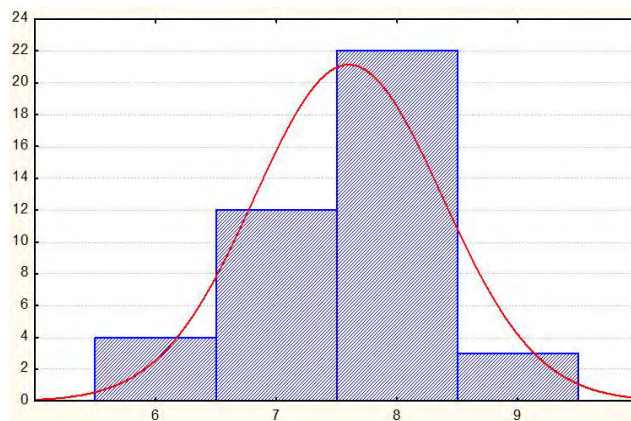value of Komogorov Smirnov test $d = .09194$ $p > .20$)

Chart 3. Distribution of obtained student's marks
(abscise->marks, ordinate->cases;
value of Komogorov Smirnov test $d = .31372$ $p < .01$)

The high correlation between the variables implies a high and statistically significant predictive value of ski technique on a result i.e. the time in GS and vice versa. Considering the obtained results, the evaluation of practical part of skiing could be objectively corrected in accordance with the results achieved in GS. General observation and the conclusion is that the students are more interested in the results of the competition than the evaluation (score) in skiing. The result of the competition is exact and there aren't two identical cases and the evaluation which comes down to four categories in example (6 7 8 9) presents grouping of different into similar. Students love to compete, to win and to differ at least in the hundredth, hence the explanation that they care more about the result in the competition than about the approximate evaluation of ski technique.

This paper is an experiment in nature, originated from the idea of the author and great interest of the students for the competition, which makes it mutually interesting and beneficial.

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POVEZANOST SKIJAŠKE TEHNIKE SA POSTIGNUTIM VREMENOM U VELESLALOMU

Sažetak

Predmet rada je skijanje. Problem, odnosno cilj rada je utvrđivanje uzročno-posljedičnih veza između konačne ocjene iz praktične nastave skijanja kao sinonima tehnike skijanja s postignutim vremenom na natjecanju u skraćenom veleslalomu. Uzorak ispitanika predstavlja 40 studenta treće godine Fakulteta fizičkog vaspitanja i sporta iz Banje Luke. Riječ je o studentima koji su u skladu s važećim planom i programom uspješno polo-žili dva tečaja skijanja. U cijelom postupku evidentirane su dvije varijable. -Konačna ocjena iz praktičnog dijela skijanja formirana je na temelju 9 skijaških tehnika koje su studenti uvježbavali tijekom tečaja. Konačna ocjena u biti predstavlja skijašku tehniku. -Druga varijabla odnosila se na postignuto vrijeme u skraćenom veleslalomu. Na temelju dobivenih rezultata može se zaključiti da postoji uzročno-posljedična veza između tehnike skijanja s postignutim vremenom na natjecanju u skraćenom veleslalomu. Navedenu konstataciju potvrđuju koeficijent korelalacije r= -.65 i determinacije r² = .42. Linearne funkcije: rezultat = 27,868-1.464 * ocjena, odnosno ocjena = 12.432-0.289 * rezultat omogućuju dobru predikciju kriterija. Korelacioni i regresioni koeficijenti su statistički značajni na razini p < .01.

Ključne riječi: *skijanje, tehnika, ocjena, natjecanje, veleslalom, korelacija, predikcija*

Image 1. Giant slalom poles
[Source: authors]