

TOP SKIER META-MODEL DEVELOPMENT

Žarko Bilić¹, Dobromir Bonacin² and Ljubiša Božić³

¹ Faculty of Sciences, University of Mostar, Bosnia & Herzegovina

² Faculty of Kinesiology, University of Travnik, Bosnia & Herzegovina

³ Bugojno, Bosnia & Herzegovina

Review paper

Abstract

Meta-model of expert system for top skier development has been suggested. In supposed model three elements of such protocol are highlighted a) global sub-model of skier development, b) sub-model of surrounding conditions during competition and 3) evaluation sub-model for evaluation and eventual correction of achievements towards top result. It is emphasized that model keeps its basic developing characteristics so it is applicable in different ski disciplines and also that possible limitations on meta-model are not there for internal logics, but strictly from recent knowledge base related to certain ski discipline. It is necessary to mention that suggested meta-model maximally respects variable conditions where the competition takes place.

Key words: *skiing, models, knowledge base, competition conditions*

Introduction

Development models in sport are usually very burdened with recent knowledge and cognitions that are strictly limited to certain specialis well known domains. This, certainly, resulted with two outcomes: 1. top achievements of closely specialized actions aimed at concrete motions and 2. Permanent changes in technology directly reflected on motion structure and transformation processes. Although we can not deny that the first outcome directly provoked the result, second outcome alerts us that the changes are happening too often. We should not even mention this happens in skiing on regular bases. This puts trainers, who train beginners and children, in ungrateful position, since it is hard to define seriously founded transformational model which will lead to the top results after 10. 15, or more years of training. (Gamma, 1982) For this reason it is necessary to found some basic paradigms so transformational process in skiing could be performed without many interventions in young skiers' development. It is very important to accept that conditions during performance of skiing tasks are very variable (type of discipline, surface, air, temperature, altitude, pressure, humidity, light, wind...) so it is almost impossible to bring all this conditions in control (Bilić et al, 2007). Skiers are relatively adaptable to many conditions they face on the trail, but the fact is they don't adapt to all conditions the same, which brings to situation they are not capable of showing maximum of their

abilities and knowledge (Elling, 2003). To maximally standardize conditions in nature is impossible, so regardless quality of sports equipment, one part of event will always be out of control. The real question is how to prepare skiers for such competitions so they would always show their full potential. One of inevitable solutions in training technologies is defining model that can integrate maximal number of conditions and predict necessary behavior on the trails and during competition. This leads to general modeling, so we presented one meta-model in this article so it can be further upgraded with new cognitions and accumulation of existing ones.

Global model

Given model (figure 1) assume the need for definition of three basic groups of knowledge 1. Knowledge of certain ski discipline (Discipline knowledge), 2. Parameters of result accomplishment (Result parameters), 3. Particular achievement data base (Knowledge base) and 4. Parameters for selection conduction (Selection parameters). It is clear that all this elements are in functional relation and they describe universal complex that can be used to define stable values of transformational processes. It is obvious that everything is based on knowledge which is a frame for the model and is constantly updated whether new cognitions are found, whether the old are being redefined.

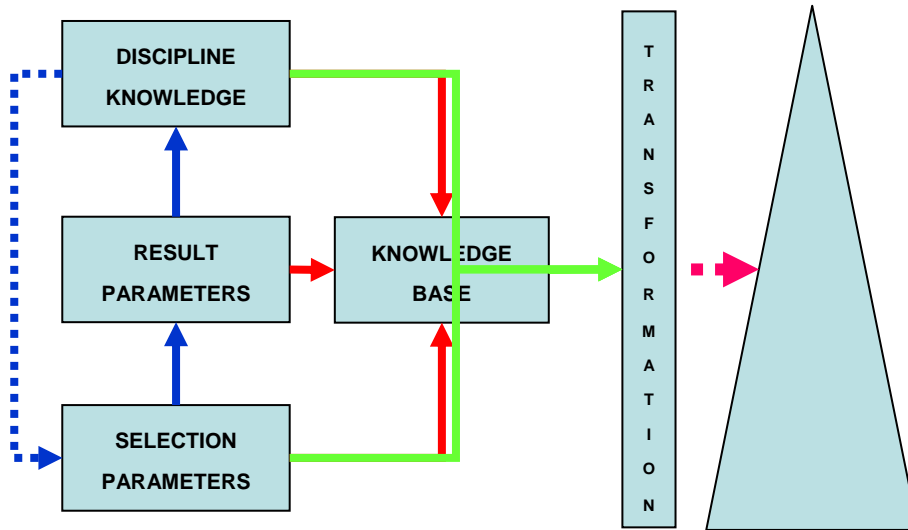


Figure 1. Global model of skiing

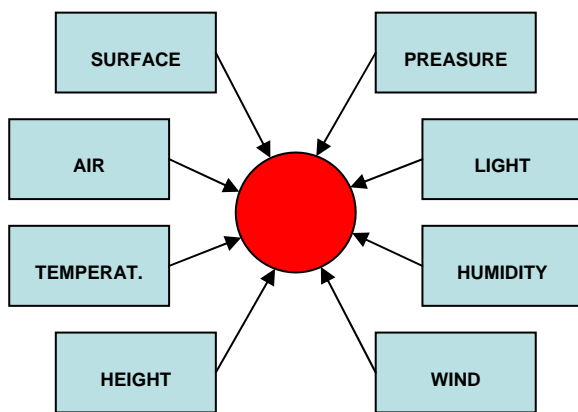


Figure 2. Model of environmental conditions

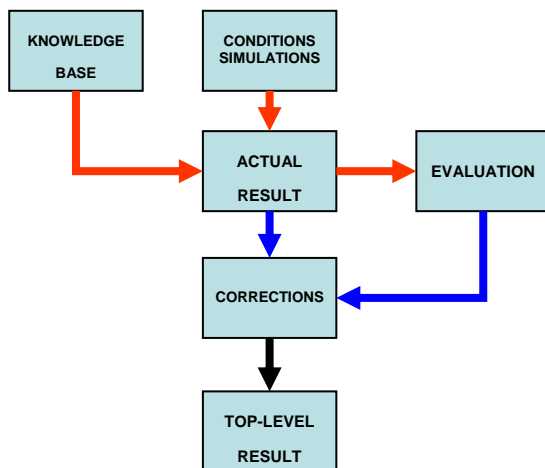


Figure 3. Evaluation model

This base of knowledge "Knowledge base" is a real complex that can be used to reliably define new cycle of transformational processes for any child that is just entering training (Matković and Ferensčak, 1996).

Assuming that this knowledge is adequate, protocol of transformations clearly defines selection parameters apropos elements according to which we make primary and secondary selection for beginners and advanced ski schools. Selection defined like that, based on knowledge, to a huge extent increase probability of training engagement of such children that really have a chance to achieve a top – level result (Žvan and Šturm, 1993). Also, "Discipline knowledge" sub-base (contains recent information about the best results in certain ski discipline, especially in universal and known part for each discipline (slalom, giant slalom,...)). This sub-complex presents crucial group of cognitions defined by bases of top skiers actual results – masters with their morphological, motor, psychological, biomechanical and other characteristics which become model for top-level achievements in actual moment.

This sub-basis is submissive to changes to the extant that some top result is achieved under conditions of unknown factors that some top skier has achieved. It is obvious that for such we need to have certain complex of information about actual results "Result parameters", so the top result is described in dimensions that can be recognized and partly determined as continuity for future creativity in skiing (Matković, Ferensčak and Žvan, 2004). As we can see in the model, all information is being constantly gathered in knowledge base that is a start point for creation of transformations that is training effect "Transformation". From such protocol we can expect good sports result "Result".

However, such model has to contain information that are directly in relation with real conditions on ski trail, which is largely different from other sports, where the conditions are highly standardized (basketball, judo, boxing, swimming, gymnastics...). Model of minimal conditions is presented in figure 2. In this description of conditions, it is possible to define one more series of details that closely recognize the environment where the ski activity is taking part, but we can also assume that this, as any other model can be easily filled with new information that enriches and continuously defines it better. It is obvious that in this kind of model information make significant part of it and that is information about quality and type of surface of skiing, air that has different characteristics, temperature of surface, air etc, altitude where competition is carried, other elements of weather conditions – primarily pressure, light, humidity, wind intensity and direction etc. It is impossible to assume all this conditions and that directly reflect on training protocol where simulation of this and other conditions should take a great part. To face skiers with such variable conditions would certainly lead achievements to a top result and all according to skier abilities and available number of training units in preparation. The procedure of evaluation contains algorithm (pre-default) group of actions which tests achievement quality of (top) skier. Such procedure respects initial assumptions in transformational process implementation ("Knowledge base" & "Conditions simulations"), based on which skier can achieve certain results ("Actual result"). Regardless how satisfied we are with this result, such result is a subject to evaluation, because small chances are that there was no mistakes, nor that it is not possible to improve training process. After conducting multiple and multidimensional evaluation, we have eventual corrections that will guide training process to achieving (or keeping) top sport ski result.

Model references

Model assumes knowledge of large number of parameters that are included in knowledge bases and constant data updating. Also environmental conditions are being constantly monitored knowing they can have significant influence on top score achievement. Third step in defining model is objective evaluation of existing parameters

which are included as methods to review and evaluate. The last but unavoidable step is to make corrections that will lead skier to possible achievement (or repeating) top sports result. This kind of protocol ensures large possibility of top scores achievement in skiing and it is obvious that this protocol is defined on a long-term as an expert system with multiple verifications.

Model limitation

Naturally, this model has no limitations that would result as a system error from the nature of the model. Surely, it is possible that certain elements don't have to contain optimal information, which is in direct relation with the level of knowledge of certain natural laws, knowledge of training technology, knowledge of certain ski discipline, type of evaluation etc. However, the most important is that this model is learning and systematically increases quantity, quality and structuralism of information "itself". That is how it directly fits into objective type of expert system without arbitrary definition of each criteria. Even though it seems very complex which it actually is, it has to be recognized that after once established, further procedure of model maintenance is extremely simple and doesn't depend on subjective definitions and evaluations, which puts it in dominant position for top ski result realization. What is crucial in this model is the time necessary for model accumulation and that time can be measured in dimensions of 4-8 years, when it becomes actual knowledge base necessary for top skier preparation.

Conclusion

Meta-model for top skier development has been suggested. Three elements of such protocol are highlighted a) global sub-model of skier development, b) sub-model of surrounding conditions during competition and 3) evaluation and eventual correction of achievements towards top result. It is emphasized that model keeps its basic developing characteristics so it is applicable in different ski disciplines and also that possible limitations on meta-model are not there for internal logics, but strictly from recent knowledge base related to certain ski discipline. It is necessary to mention that suggested model maximally respects variable conditions where the competition takes place.

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META-MODEL RAZVOJA VRHUNSKOG SKIJAŠA

Sažetak

Predložen je meta-model ekspertnog sustava razvoja vrhunskog skijaša. U pretpostavljenom modelu naročito su važnim označena tri elementa takvog protokola: a) globalni sub-model razvoja skijaša, b) sub-model okolišnih uvjeta pri natjecanju, i 3) evaluacijski sub-model za vrednovanje i eventualnu korekciju postignuća ka vrhunskom rezultatu. Naglašeno je da model zadržava temeljna razvojna svojstva te je primjenjiv u različitim skijaškim disciplinama, a također i da moguća ograničenja meta-modela nisu zadana iz interne logike, već isključivo iz aktualne baze znanja vezane uz pojedinu skijašku discipline. Za istaknuti je da predloženi meta-model u maksimalnoj mjeri uvažava varijabilne uvjete u kojima se natjecanje odvija.

Key words: *skijanje, modeli, baza znanja, uvjeti natjecanja*

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Correspondence to:

Assist.Prof. Žarko Bilić, Ph.D.

University of Mostar

Faculty of Sciences

Matice Hrvatske bb, 88000 Mostar, BiH

Phone: +387 (0)63 325 690

E-mail: zarko@eromerc.com