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Pragmatic Validity of the Combined Model of Expert System for Assessment and Analysis of the Actual Quality Overall Structure of Basketball Players

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A B S T R A C T

The authors presumed that it was possible to replace certain criteria of the expert system aimed at evaluating actual quality of basketball players, proposed by Trninić et al.[1], with the corresponding indicators of situation-related efficiency (official statistics of the game). Hence, the aim of this study is to verify the potential of establishing such a combined model of expert system that would consist of both the evaluation criteria and certain number of objectively measurable aspects of actual quality (player's partial performance or playing efficiency) and to determine its pragmatic validity. To achieve the aim the sample comprised of 60 basketball players that were competing in the Croatian First Division League in the 1998/99 season was tested. The sample and their quality of play was described by the two different types of data: 1) the 13 situation-related efficiency data (FIBA statistics of the game) utilized to objectively assess performance or playing effectiveness of players, collected at 132 games played by 12 teams, and 2) the evaluation data, subjectively assessing actual quality of players, i.e. their perceived overall performance, collected at the end of the season from the 10 basketball trainers. On the basis of relatively high correlations within the 7 pairs of mutually equivalent variables (from 0.63 to 0.84) and the extremely high correlation (0.97) obtained between the perceived overall performance (actual quality), subjectively assessed with respect to the 19 criteria of the original expert evaluation system, and the overall performance (actual quality) assessed by the combined model (where the 8 evaluation criteria had been replaced by the 7 corresponding indicators of playing efficiency), it is feasible to consider the combined model of expert system as an acceptable tool for more objective and economical assessment of actual quality of basketball players.

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Introduction

Systems for evaluation of basketball players' quality differentiate between the potential and actual quality of a player. The notion *potential quality* or just *potential* refers to a current developmental level of a player's basic anthropological characteristics (capabilities, attributes, skills, and knowledge). Through adequate methods of the training process these capabilities can be transformed into the sport specific anthropological attributes required in the game, harmoniously enhanced and developed. As such, they are a presumption for achieving a high level of overall performance, that is actual quality of a player manifested under the competitive conditions. So, the notion of *actual quality* implies the level of total successfulness in the game[1–4].

The analysis and comparison of the potential and actual quality provides the coach with useful information about the level and structure of the potential itself, about the degree and the mode of utilization in the game, as well as about its capacity to be developed (trainability). So far obtained results in the previous studies suggest that the evaluation of overall potential and actual quality of players can be used as an instrument for orientation to and specialization of players for adequate positions and roles in the game, then it can be used as an indicator of the current status of the situation-related preparedness and in the process of selecting players. The structure, standardized profile of indicators that determine the overall potential and actual quality of players, has an important role in the efficient orientation and selection of players, in the rational management of the training process, in the monitoring of actual quality/performance and in the selection of tactics and playing concept (Figure 1). This symbiosis of the basketball players' quality evaluation (the reference starting point) and the role of the coach in the sports preparation process are essential in the formation of a system which will produce top quality players and competi-

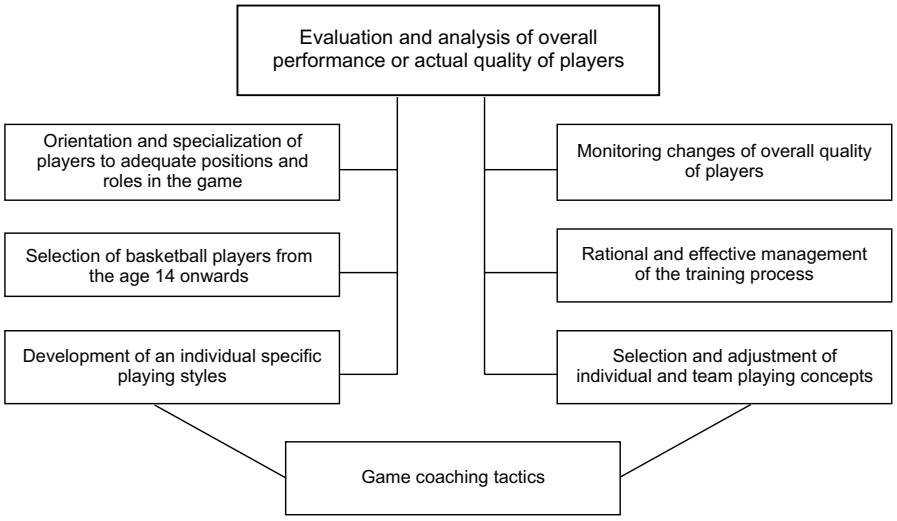

Fig 1. The influence of evaluation and analysis of overall structure of actual quality on coaches in the sports preparation process.

tive achievements due to the fact that it enables precise definition of the goals that should be achieved by the training process and, in accordance with them, a design of the integrated model of training[5].

Besides the difference between the potential and actual quality of basketball players, one can differentiate between the two forms of actual quality: the concept of *overall performance* and the *situation-related* or *playing efficiency of basketball players*. The notion *overall performance* in the game is a compound consisting of all the elements of actual quality of players manifested in a competition, perceived and estimated by experts, whereas *situation-related efficiency* of players regards just those elements that are recorded in the game statistics (i.e. the thirteen standard FIBA indicators of efficiency/performance). Therefore, playing (situation-related) efficiency of basketball players is a component of overall performance in the game (overall actual quality) that is measured objectively with statistical records of the game. Playing efficiency, expressed in the game statistics, is therefore considered as just a partial performance of the basketball players in the game[6].

In accordance with the above-mentioned, actual quality of a particular player can be evaluated by means of:

– the objective assessment of playing efficiency on the basis of the situation-related indicators (e.g. number of offensive rebounds or steals);
– the subjective assessment of overall (perceived) performance in the game;
– the combination of the both approaches.

Since assessment of the situation-related efficiency by means of the objectively measurable factors, which are only a component of overall performance of a player, cannot express all the aspects of actual quality nor describe the entire complexity of the game, the concept of creating a unique evaluation expert system which would comprise both the objective and subjective way of assessing player's actual quality naturally arises.

So far, Trninić, Perica and Dizdar[1] have set the system of criteria for observation and evaluation of overall performance (actual quality). Trninić and Dizdar[3] afterwards determined the weights or coefficients of importance for each of play positions in the game based on a high level of interobserver agreement (objectivity) among experts (from 0.91 to 0.98) and then tested it empirically[4].

In the present study the authors presume that within this evaluation system, the purpose of which is to subjectively estimate overall performance or actual quality of a player, the potential exist for replacing of certain criteria with the corresponding indicators of situation–related or playing efficiency. They suggest the eight evaluation criteria to be replaced with the 7 indicators of playing efficiency as follows:

– the criterion *free throws* to be replaced with the coefficient of free throw shooting percentage;
– the criterion *rebound efficiency on offence* to be replaced with the number of offensive rebounds;
– the criterion *rebound efficiency on defense* to be replaced with the number of defensive rebounds;
– the criterion *the ball possession gained* to be replaced with the number of steals;
– the criterion *blocking shots* to be replaced with the number of blocked shots;
– the criterion *passing skills* to be replaced with the number of assists;
– the criteria *inside shots* and *outside shots* to be replaced with the coefficient of the field goal shooting percentage.

Such an approach should assess the objectively measurable aspects of a play-

er's quality/performance more effectively so enabling more economical and accurate estimation of overall actual quality. And, to verify this hypothesis is exactly the purpose of this study.

Previous research studies

In the past 60 years a number of research studies have been published. They have all dealt with the evaluation of player's efficiency. For instance, Elbel and Allen[7] proposed the method for evaluation of individual and team efficiency based on recorded events on the court (playing efficiency factors) that ultimately had either the positive or negative influence on the final score of the game. Each particular factor was subjectively graded in accordance to its contribution to the team success. Unfortunately, the data concerning the rival teams' performance were not registered, nor were the data collected continuously through the three competitive seasons. The authors concluded that many of these game situations often appeared during the game and therefore affected the final outcome of a match. In their opinion the proposed model could contribute to enhance evaluation of individual and team performance. The authors were already aware of the differences between the individual and team aspect of a player's performance (the latter regarding contribution of a particular player to performance of his/her team -mates), which approach provides a more effective analysis of the game.

Swalgin[8] proposed the evaluation system for the individual player's performance known as the Basketball Evaluation System (BES). Keeping in mind the structure of the game and the significance of specialization to particular positions, the set of standards was specially devised to evaluate the efficiency of an individual player with regard to assigned positions and roles in the game.

Swalgin[9] conducted a research study to establish the validity of the two different models that assessed situation-related efficiency of a player. The first model determines the overall grade of a player's performance based on nine common indicators of situation-related efficiency relative to a player's position and time played in the game. The second model evaluates overall performance based on the importance weighting factors of playing efficiency developed by a group of expert coaches (n = 18). They estimated significance of each of the individual performance factors in relationship to the position. Another group of expert coaches (n = 10), randomly selected, evaluated the overall performance of 45 NCAA Division I. players. The obtained results from the latter subjective assessment from 10 expert coaches correlated statistically significantly with the performance evaluation of both the first and the second model (0.96 and 0.79, respectively).

Dežman[10] employed five categories of criteria to evaluate (by grades from 1 to 5) general playing efficiency of junior basketball players. These criteria include the levels of playing efficiency, a player's responsibility, performance stability or consistency and successfulness of play in the older age group.

Erčulj[11] studied a sample of 22 cadet representatives from Slovenia (the 1979 and 1981 generation) who played for the European Championship. His objective was to determine the relationship between the morphological–motor potential quality (evaluated by means of the ND and DEX evaluation systems), a player's performance (graded on the 1–5 scale by the head coach and assistant coach) and situation-related efficiency on the basis of the absolute and relative indexes of performance (Dežman[12]). The results indicate that the both models correlate moderately with the coaches' criteria scores (0.87). The correlation was found also with

the morphological-motor potential quality and player's efficiency, 0.63 and 0.78, respectively. The lower correlation was registered between the morphological--motor potential quality and the index of absolute performance (0.45 and 0.63). The correlation between estimated performances with the index of absolute performance quoted 0.79, whereas it was 0.58 with the index of relative performance.

Gréhaigne, Godbout and Bouthier[13] proposed the original evaluation model to grade the performance of particular players on offence in different team sports (basketball, rugby, handball, football, volleyball). Results defined two indicators: index of efficiency and game volume, the combination of which enabled close evaluation of actual performance based on the observation of a player in the game during a match. The study recommends the use of a nomogram in different team sports on the basis of which individual results of situation-related efficiency could be estimated by combining the both indicators.

Trninić, Perica and Dizdar[1] proposed 19 criteria for evaluation of actual quality or overall performance of top quality basketball players (perceived actual competitive abilities manifested as a player's behavior in a match), consisting of 7 for performance on defense (transition and position) and 12 for performance on offence (transition and position). Further, Trninić and Dizdar[3] determined the significance (weights of importance) of the above-mentioned criteria relative to position in play. The weights (ponders) were determined from the subjective estimation of 10 expert coaches by means of the AHP (Analytic Hierarchy Process) method.

Trninić, Dizdar and Dežman[4] tested empirically the weighted system of the criteria for the actual quality/performance evaluation, which was proposed by Trninić and Dizdar[3]. Based on the determined descriptive indicators, the coefficients of importance of criteria, and on the inter-observers degree of agreement (objectivity level) achieved in the expert evaluation, it can be concluded that the measuring attributes (objectivity and sensitivity) for most of the criteria are in accordance with the coefficients of importance for a particular position in the game and so is the proposed structure of the relevant criteria for each position.

Dežman, Trninić and Dizdar[6] set and tested empirically the expert system model for more effective orientation of players to particular positions and/or roles in the game. Based on the obtained results, it was determined that the system could be used as an instrument for orienting players to adequate positions or roles. Results indicate that players have attained the highest grades for overall performance when playing their primary position. The greatest differences were determined between point guards (position 1) and centers (position 5). The most difficult tasks were, in a decreasing order, to determine optimal position for small forwards (position 3), then for shooting guards (position 2) and lastly for power forwards (position 4) because all these players are versatile ones. Therefore, the reliability of the system is the lowest when it is applied for selecting for and orienting players to these positions. This research has also reinforced the thesis that body height is a variable with the greatest influence on orientation of players to appropriate positions or roles in the game.

Material and Methods

Sample

The sample consisted of 149 players from 12 basketball clubs (Cibona, Zadar, Benston, Split, Zrinjevac, Zagreb, Šibenik, Svjetlost Brod, Kandit Olimpija, Telecomp, Croatialine and Vajda) from the Croatian 1st Division League that played

at least one minute in the 1998/1999 season. The authors of this research, in order to enhance reliability of the playing efficiency assessment[9], draw out the group of 98 players (covering all five positions) who had the minimal amount of 10 minutes of play in each of at least 10 games (out of the total of 22 matches). From this group 12 players per each position had been randomly selected, hence the sample in this research study consisted of the total of 60 players.

Variables

The variables or the original expert system evaluation criteria proposed by Trninić, Perica and Dizdar[1] were employed to assess and analyze the players' actual quality or overall performance on both the transitional and positional phases of the game.

The variables (criteria) used to evaluate and analyze the overall performance on defense are: 1) level of defensive pressure (DPRESS); 2) defensive help (DH); 3) blocking shots (BS); 4) the ball possession gained (BPG); 5) defensive rebounding efficiency (DRE); 6) transition defense efficiency (TDE); and 7) playing multiple positions on defense (MPD).

The variables used to evaluate actual performance of players on offence are: 8) the ball control (BC); 9) passing skills (PS); 10) dribble penetration (DP); 11) outside shots (OS); 12) inside shots (IS); 13) free throws (FT); 14) drawing fouls and three-point plays (DF3PP); 15) efficiency of screening (ES); 16) offence without the ball (OWB); 17) offensive rebounding efficiency (ORE); 18) transition offence efficiency (TOE); and 19) playing multiple positions on offence (MPO).

In addition to employing the above described expert evaluation system, the combined model of expert system was utilized as well to assess overall performance of the sample. It was designed in a way that certain subjective criteria were replaced by the objectively measurable indicators of situation-related efficiency.

The combined model of expert system consisted of the criteria and indicators of performance on defense:

1. level of defensive pressure (DPRESS);
2. defensive help (DH);
3. blocked shots (BLK) – being equivalent to the criterion *blocking shots* (BS);
4. steals (STL) – being equivalent to the criterion the *ball possession gained* (BPG);
5. gained defensive rebounds (DREB) – being equivalent to the criterion *defensive rebound efficiency* (DRE);
6. transition defense efficiency (TDE);
7. playing multiple positions on defense (MPD).

The criteria and indicators of performance on offence:

8. the ball control (BC);
9. number of assists (AST) – being equivalent to the criterion *passing skills* (PS);
10. dribble penetration (DP);
11. coefficient of scoring efficiency (KUIG) – being equivalent to the criteria of *inside shots* (IS) and *outside shots* (OS). Calculated from the equation: $KUIG = (2 \times P2 + 3 \times P3) \times KIG$, where P2 is the number of the scored shots for the two-point field goals, P3 is the number of the scored shots for the three-point field goals, KIG is the coefficient of scoring efficiency calculated by $KIG = (P2 + P3)/(U2 + U3)$, where (P2 + P3) is the total number of the scored shots and (U2 + U3) is the total number of the field goals attempted;
12. coefficient of successful free throws (K1) – being equivalent to the criterion *free throws* (FT). Calculated from the equation $K1 = P1/U1$, where P1 is the number of the scored free throws and U1 is the total number of the free throws attempted.

13. drawing fouls and three-point plays (DF3PP);
14. efficiency of screening (ES);
15. offence without the ball (OWB);
16. gained offensive rebounds (OREB) – being equivalent to the criterion *offensive rebound efficiency* (ORE);
17. transition offence efficiency (TOE);
18. playing multiple positions on offence (MPO).

Data collecting methods

In this research study the two sets of data were used:

1. Data representing variables of the situation-related efficiency were collected at the total of 132 games played by the twelve teams competing in the Croatian First Division League in the 1998/99 season. Each team played twice against each opponent (one game as a host, the other as a guest), 22 games altogether. At each game effectiveness of every player was recorded according to 13 criteria – the FIBA official game statistics standard records, indicators of performance: two-point field goals (2FGM), two-point field goals missed (2FG-missed), three-point field goals (3FG-made), three-point field goals missed (3FG-missed), free throws (FTM), free throws missed (FT-missed), offensive rebound (OREB), defensive rebound (DR), assist (AST), personal foul (PF), turnover (TO), steal (STL), and block shots (BLK). Official trained observers for statistics recorded the data.

2. Data for the subjective evaluation of actual quality or overall performance were collected at the end of the same season by a survey from ten trainers who coached the observed teams. Each coach was asked to use the following grades to evaluate perceived performance of each player relative to the 19 criteria of the subjective expert system[1]:

– very poor (far below average quality);
– poor (below average quality);
– good (average quality);
– very good (above average quality);
– excellent (outstanding, far above average quality).

By means of these grades the coaches evaluated the perceived actual quality manifested as overall performance of players in accordance to position that he primarily played on a team (which was also determined by help from the coaches).

Data processing methods

The ten coaches (judges) evaluated the variables of actual quality on offence and defense. The acquired data were processed in the following two stages:

In the 1st stage, the coaches assessed the play and the average grades the players achieved in each criterion were weighted by the coefficients of importance for their respective primary play positions on defense.

$$uki_{j,O} = S_{j,O}P_{j,O}$$

where, $uki_{j,O}$ is the vector of overall performance on defense by players at the position j ($j = 1…5$); $S_{j,O}$ is the matrix of average grades determined by the group of expert coaches.

The players were graded for the position they primarily play j ($j = 1…5$) and evaluated according to the seven criteria (variables) which measured overall performance on defense. $P_{j,O}$ is the weighted vector (coefficient of importance) of the defensive performance criteria at the position j ($j = 1…5$).

The evaluation of actual quality of players on offence was performed by the following operation:

$$uki_{j,N} = S_{j,N}\, P_{j,N}$$

where, $uki_{j,N}$ is the vector of overall performance of players on offence at the position j ($j = 1…5$); $S_{j,N}$ is the matrix of average grades determined by the judges. The players were graded for the position they primarily play j ($j = 1…5$). They were evaluated according to the 12 criteria (vari-

ables) that measured overall performance of players on defense. $P_{j,N}$ is the weighted vector (coefficient of importance) of criteria for evaluation of overall performance of players on defense at the position j *(j = 1…5).*

In the 2nd stage, the composite variable of overall performance of players on the both phases of play, defense and offence, was calculated by the following simple linear operation:

$$uki = uki_O + uki_N$$

where, *uki* is the vector overall actual quality of players; uki_O is the vector overall actual quality on defense; uki_N is the vector of overall actual quality on offence.

Then the data obtained from the combined model of expert system were subjected to the same procedure to calculate the composite variable of overall actual quality of players. Instead of the original 8 variables, obtained from the graded performance of players with regard to the criteria, the authors have interpolated the equivalent variables for situation-related efficiency, which were standardized and then scaled (1–5). This was computed by the following operation:

$$soi = zi \times 0.83 + 3.$$

The basic descriptive parameters on the both obtained composite variables of overall performance or actual quality were calculated (arithmetic mean, standard deviation, minimum and maximum, as well as measures of asymmetry and curvature). Normality of distribution was tested by means of the K-S test. The degree of objectivity (interobserver agreement) was assessed by the Cronbach's reliability method. The correlation of the each criterion with the corresponding indicator of situation-related efficiency was estimated, and so was correlation between the two variables of the perceived overall performance or actual quality obtained by means of the original, subjective expert evaluation system and by the combined version of the same system.

The statistical-graphic software package Statistica, Version 5.0, was used to process the data at the Faculty of Kinesiology, University of Zagreb.

Results

The performance or actual quality of players on defense was calculated as a linear combination of differentially weighted results according to the seven variables of the original expert system, on the one hand, and the same was done for offence according to the twelve variables, on the other. Consequently, the score (UKI_S) of the perceived overall performance was calculated as a simple (non-weighted) linear combination of scores obtained for performance of players on defense and for performance on offence.

The same procedure was applied for the overall performance calculation executed by means of the combined model of the expert system (UKI_C). Table 1 shows the relative descriptive parameters of the both calculated, composite variables representing overall performance or actual quality of the observed sample of basketball players.

The distribution parameters implied a slight positive asymmetry, but it was not statistically significant according to the K-S test (maxD < test). In fact, the both computed variables produced the very similar distribution results. The authors assume that the slight positive asymmetry of distribution should be assigned to the sampling protocol. Namely, only the players that had satisfied the lowest criterion of the play time threshold – the minimum of ten minutes of play per each of at least ten matches during the season were included in the sample. That time requirement provided greater reliability of the performance assessment for the whole season. Further, it is well known

TABLE 1
DESCRIPTIVE PARAMETERS OF ACTUAL PLAYER QUALITY ASSESSED BY THE TWO EXPERT MODELS

	X	Min	Max	SD	a3	a4	MaxD	α
UKI_S	6.31	4.94	8.27	0.74	0.22	–0.44	0.028	0.96
UKI_C	6.22	4.98	8.41	0.78	0.23	–0.54	0.03	0.98

$TEST_{0.05} = 0.17$

UKI_S = original evaluation model; UKI_C = combined model; X = mean (m); Min = minimum; Max = maximum, S.D. = standard deviation; a3 = coefficient of asymmetry; a4 = coefficient of curvature; MaxD = maximum deviation of relative cumulative empirical frequency from relative cumulative theoretic frequency; α = coefficient of reliability by Cronbach

from experience that consistent quality players, if not injured, play most of the time because they produce sports results. Therefore, most of the rest of the observed population may be considered as players of a somewhat lower quality level or lower efficiency. The descriptive indicators of the both variables of overall actual quality were also very similar.

The interobservers' agreement (objectivity) among judges evaluating the quality of play by the criteria of the original evaluation expert system of overall performance was 0.96 which can be regarded as a very high level of consent. Therefore, the overall performance variable, obtained by the subjective evaluation of the ten experts on the basis of the weighted criterion system (the original expert system) may be feasibly considered the criterion variable in the process of the combined model pragmatic validity determination. An even higher degree of objectivity (0.98) was achieved when assessment of overall actual quality was performed by means of the combined model, which is conceivable since the 8 subjectively assessed variables were replaced with the 7 equivalent variables of situation-related efficiency that were more objectively measured. Justifiability of such an approach was confirmed by relatively high connectedness within the pairs of mutually equivalent variables (i.e. the pairs consisting of the replaced original criteria and their efficiency indicators substitutions, Table 2).

Namely, Table 2 clearly implies that the correlation among all the equivalent variables ranges from moderate to relatively high (from 0.63 to 0.84), which consequently produces a relatively high degree of interacting similarities and, naturally, allows for their successful employment instead of the corresponding original, subjectively estimated variables. This hypothesis is confirmed also by the extremely high correlation (0.97) between the two calculated, composite variables of overall performance or actual quality, that is between UKI_S, obtained by applying the original model of the weighted expert system (perceived and subjectively evaluated performance), and UKI_C, obtained by means of the combined model.

Discussion

The original system of criteria, devised by Trninić, Perica and Dizdar[1], the purpose of which is to evaluate actual quality (perceived overall performance) of basketball players, allows for the certain criteria to be replaced with the equivalent variables of the situation-related or playing efficiency (partial performance). Therefore, the aim of this study was to assess the potential of designing such a combined model of the quality evaluation ex-

TABLE 2
CORRELATION BETWEEN VARIABLES OF SITUATION-RELATED EFFICIENCY AND THEIR EQUIVALENT PAIR VARIABLES SUBJECTIVELY ASSESSED BY COACHES

BLK-BŠ	STL-BPG	DREB-DRE	OREB-ORE	AST-PS	K1-FT	KUSIG-I_OS	UKI_C-UKI_S
0.79	0.68	0.84	0.73	0.7	0.71	0.63	0.97

UKI_S = perceived, subjectively evaluated overall actual quality of players; UKI_C = variables of overall actual quality evaluated by means of the combined model

pert system and to determine its pragmatic validity.

On the basis of the obtained results the two composite variables of overall performance/actual quality were determined. As expected, the descriptive indicators of the both composite scores of actual quality did not show great variance; instead, moderate to high correlations (from 0.63 to 0.84) within the pairs of certain mutually equivalent variables (evaluation criteria and situation-related efficiency indicators) were obtained. The extremely high correlation was achieved between the variables of the perceived overall performance(UKI_S), subjectively assessed by the 10 experts by means of the weighted evaluation system, and overall player's performance assessed by the proposed combined model (UKI_C).

Therefore, it can be concluded that the combined model of expert system may be considered an acceptable solution for evaluating actual quality of basketball players since it provides sufficient information and makes the assessment procedure more accurate, economical and objective.

The proposed combined model of expert system enables a coach to evaluate overall actual quality of his/her players and interpret the results within the range of his/her expert proficiency and experience. Analysis of both the level and structure of performance, especially relative to different opponents and game systems is provided, as well. In accordance to the obtained results from analysis, a trainer may design and program more effective intervention strategies and tactics and the training process can be managed in a more rational and effective way. Further, such a tool is indispensable in orientation and specialization of players to adequate positions and roles, in monitoring changes of actual quality, in designing and selecting adequate game concepts (strategies and tactics), as well as in coaching a particular basketball game. Application of the combined expert system model aimed at evaluating overall performance can significantly decrease mistakes made by coaches in all the areas of his/her professional work, consequently improving the whole training process. This is especially true when coaches have to determine how well the players are prepared (sport conditioning status and sport form). On the basis of such analysis, coaches are able to define accurately the goals of the training process and to design appropriate developmental programs for enhancing overall quality of players. It is also significant for the training methods, especially when the tasks of transforming the player's weak attributes into the strong ones are concerned within the framework of the integrated training[5]. Hence, a coach should regard the process of evaluating and analyzing the structure of actual quality of top quality basketball players, both the young and experienced ones, as the most important resource of information in the process of developing their abilities and skills.

On the other hand, the combined model has also a goal to encourage player's

self-evaluation; that is to incite in every player the need and proficiency for evaluation of his/her own abilities to satisfy the set playing concepts, actualize his/her own basketball potential and satisfy requirements for a particular position in the game.

The combined methodological approach to assessment and analysis of the structure of overall performance or actual quality of players in team sports may also provide new insights into factors and principles of the game that either contribute to or hinder individuals and teams from achieving the desired sport results, thus allowing new research projects with either theoretical or practical value.

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PRAGMATIČKA VALJANOST KOMBINIRANOG MODELA EKSPERTNOG SUSTAVA ZA PROCJENU I ANALIZU UKUPNE STRUKTURE STVARNE KVALITETE KOŠARKAŠA

SAŽETAK

Autori su pretpostavili kako je moguće u izvornom kriterijskom sustavu, koji su postavili Trninić, Perica i Dizdar (1999.), a koji je namijenjen subjektivnoj procjeni stvarne kvalitete košarkaša, određeni broj kriterija zamijeniti njima odgovarajućim varijablama situacijskog učinka. Stoga je cilj ovog rada provjeriti mogućnost formiranja takvoga kombiniranog modela, koji bi se sastojao i od ekspertno procijenjenih kriterija i od objektivno mjerljivih aspekata stvarne kvalitete košarkaša, te utvrditi njegovu pragmatičku valjanost. Za ostvarenje ovog cilja korišten je uzorak od 60 košarkaša iz 12 klubova prve hrvatske košarkaške lige koji su igrali u sezoni 1998/99. Odabran uzorak igrača opisan je dva tipa podataka: 1) službenim (FIBA), standardiziranim podacima (13) o situacijskoj učinkovitosti koji su prikupljani na 132 utakmice i 2) podacima za subjektivnu procjenu kvalitete igrača (opažena ukupna natjecateljska uspješnost)

prikupljenima na kraju sezone od 10 košarkaških trenera koji su te momčadi vodili u istoj sezoni. S obzirom na relativno visoke korelacije međusobno ekvivalentnih varijabli unutar 7 parova (od 0,63 do 0,84) te vrlo visoke korelacije (0,97) između kompozitne varijable ukupna stvarna kvaliteta košarkaša, procijenjene isključivo subjektivnom procjenom prema izvornih 19 kriterija, i varijable ukupna stvarna kvaliteta košarkaša, procijenjene kombiniranim modelom u kojemu je osam subjektivno procijenjenih varijabli zamijenjeno sa sedam njima odgovarajućih varijabli situacijskog učinka, zaključeno je da se kombinirani model može smatrati prihvatljivim rješenjem za ekonomičniju i objektivniju procjenu ukupne stvarne kvalitete košarkaša.