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Editor of series: Nenad Živanović, email:znenad@filfak.filfak.ni.ac.yu
Address: Univerzitetski trg 2, 18000 Niš, YU
Tel: (018) 547-095, Fax: (018)-547-950

THE PLACE AND THE ROLE OF THE APPLICATIVE SOFTWARE IN THE STRUCTURE OF THE SYSTEM FOR OPERATING THE SPORT FORM

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Zoran B. Pajić

Faculty of Physical Culture, Belgrade, Yugoslavia

Abstract. *At the present study the significance of systemic establishment of control over the information in order to optimalize the system for operating (controling) the sport form, which is a complex, dynamic system, has been emphasized. The significance of the efficiency improvement of the feedback subsystem within a system for operating by inclusion of an application software which is the element with the feedback-comparative role, has been particulary emphasized. The partial system structure has been determined both on application of decomposition and with system analysis, denoting the most significant components and elements, particulary the comparator (software) and quality and quantity of relations between them as well. Certain number of methodically established facts originated from the field of controling and operating the sport status, has been integrated using the basic cybernetic elements and ideas (control, algorhytm, information etc.). The realization of the operating of the sport status is to be conducted according to suggested system model. The main part of its entire function is realized using the aplicative software which insures optimalization, efficiency and considerable influence upon control of a system behavior, all of on the basis of mathematical and stastistical procedures and prompt interpretation.*

Keywords: *system, optimalization, software, operating*

1. OPTIMALIZATION OF THE SYSTEM FOR OPERATING THE SPORT FORM

Sport training represents the specific process on which the sport result depends. It is realised through specific means, methods and loads within certain period of time. All changes in sportsman's organism caused by specific training loads are not predictable, but the general direction of changes occured under the influence of applied exercise is

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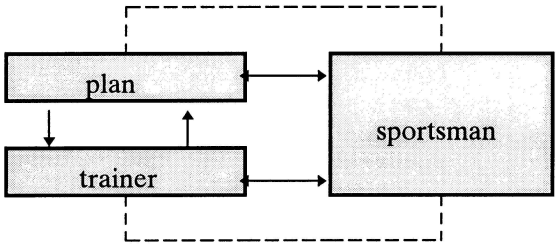
possible to determine. Therefore, a bond for greater actualizaton of the operating of the sport training process by the number and informations kind availible, is to be imposed.

The latest researchs of problems related to the operating of the sport training process were performed using the cybernetic methods. Cybernetics ("kibernetes" - the Greek - to manage) is the science of an optimal influence upon complex dynamic systems[1]. It has been emphasized by [17]: "The operating is transfering process from one condition to another. While operating a training process the role of the system element which operates is taken by a trainer, while the element which is both operated and at certain phases the self-operating element, is taken by a sportsman, the competitor. The third element of the system with the sygnal creating function is the training plan." Those are the instructions refered to training method, applied instruments, volume, intensity, work frequency, quality and quantity of rest etc. (Scheme 1).



Sheme 1. Elements of the structure of the SOSF (according to [17])

In that kind of system trainer has the controlling and corrective role, because sportsman is changed according to the above-mentioned signals. At this point of time, because of use of modern diagnostical and prognostical methods trainer has more and more knowledge, and the accurate information on the above-mentioned changes. If trainer has no accurate and objective reccurent information (feedback), often mistakes and incorrect directioning of developement process occure. Acording to [5], the complexity of operating that process is the fact that trainer operates sportsman's activity rather than cumulative training effect which is impossible to operate in a direct way. Certain changes are to be sustained by sportsman, desiganted as the instantaneous (direct) training effect, i.e. as the result of conducted training. If there is a proper organisation of the system within its complex dynamics, on the basis of systemic training a large number of direct, prolonged effects is summed, i.e. the cumulative effect occure. Therefore, the feedback information related to sportsman's reaction, the instantaneous and cumulative effects are of importance. For a considerable period of time sport results were created using "a sportsman guidance technique", based on both intuition and the experience model for operating the sport form. Nowdays actual methods for operating the sport form do not reject the intuitive methods of making decisions on training process, but those have the objective information support on both sportsman's condition and effects of training process upon that condition.

The effect of the operating of the training process depends on quality and quantity of

[1] Flehtner, according to [12]

information received by sportsman as well as on the information about sportsman's condition and work which are analysed and by corresponding method transfered to sportsman from trainer. Every system has its own goal, prefered condition within certain moment or interval of time. The goal has to be distinct, precise, that is, it has to be quantitatively expressable.

The goal of the operating of this kind of system is for the guided element to change from initial condition (Rx) to another, qualitatively higher state (Ry) expressed as a stage or the final result:

$$Rx \rightarrow Ry$$

all on the account of the influence of the element with an operating, revisioning, improving element (the trainer).

Operating of this kind of sistem begins with collecting, that is, with diagnosticating of as much as possible information on the initial (Rx) sportsman condition. It is refered to a minimal number, quality and parameters (variables) importance, on which basis the diagnosticated state is assumed relevant, i.e. with the smallest diagnostical and prognostical error.

A task of operating is to achieve the goal (the result) with the minimum material costs, i.e. to achieve it in an optimal way. One of the optimalization tasks is the necessity to shorten time as much as possible with the expected result achieved.

The arguments brought so far, elucidated the essence of operating, which is permanent control of quality, capacity and sportsman's adaptibility mode to constant change of conditions (stimuli), that on the other hand causes the acumulation of variety of information (data). This creates the problem of storage of actual information and rejection of unnecessary information, which on behalf of their character change, i.e. their accuracy, overload the whole system and diminishe the system efficiency. Much to bigger problem represents the input of modifications, because all of the actual data are of dynamic nature, i.e. those (data) have values changed across time. A particular difficulty, when there is a need for accuracy and expediency is the collecting of the actual data.

The essentail solution for this problem is the systemic establishment of control over the information using the corresponding methods and means of data classification, processing and sistematization. Creation of the applicative softwares is the endavour to take the control over the information and their circulation. Many a systems with their functions realised by an applicative software, and with informatic technology as an instrument that enables the efficient establishment of control by taking the control over the main system function, have already been created.

With developement of cybernetics an open possibility for exploring the operating system using mathematical and statistical methods emerged. Modern computers enable us to resolve any practical problem, under condition of knowing the algorhytm for problem solution [12]. The notion "algorhythm" has become the basic notion of programming of the training process when regarding to the fact that the training process in which different problems are solved is in fact a search for the algorhytm of an optimal influence upon sportsman. This improves the efficiency of training process.

Personal computers with simple and no-intermediate operative-staff usage, are very wide spread nowdays. With using them within the system for operating both sport training and sport form, great opportunitues are offered. With creating a corresponding, especially

designed software, the very new dimension of monitoring reveales, as well as the possible dimension of comparing and evaluating the training process within diagnostics, prognostics and training methodics.

Software represents the group of data and instructions assigned to a computer [9]. The instruction instruct the computer what to do with the data, how to process and organize them.

The group of inbetween connected data or instructions, as well as the contemporary connected data and instructions represent "the file". The group of more than one correlated files with task resolving function represents the program. Using the instruction of some of program languages, software can be especcialy designed to resolve a specific problem. Already designed programs which resolve wide-spread problems represent the applicative programs. The usage of this kind of technology enabled trainers to use time in a much more rational way.

2. SYSTEM

The term "system" originates from the Greek word "systema", underwhich the extracted reality fragment represented in a form of both element sum and inbetween-elements existed relations and their characteristics, is understood. Whether a group of elements should be observed either as system or not, depends, in the first place, on the level of connection among the elements within a system, and the extraction level of a system out of surrounding. According to previously mentioned, a systemic approach, that is a methodical approach with complex treatment of the objects of the exploration, i. e. with the object of the exploration treated as a system and within domain of general theory of systems, is necessary.

According to the level of interaction between the system and the surrounding, [14] differs enclosed (there is no interaction with surrounding i.e. the energy, mass and the information exchange in amount which can influence characteristics of the system) relatively enclosed (precisely determined input from surrounding which influence the system, and the system output that influence the surrounding) and opened (there is a totality of inbetween activities of system and surrounding) systems. The classification of systems according to complexity, stability etc. exists, but the cybernetic systems, i.e. certain class of dynamic systems (the operated systems) are of particular importance. Lemer, according to [14] emphasized: "The specific characteristic of operated system is the capability to fluctuate (to move), and to transfer to different stage under different influences... There is always a certain sum of fluctuactions out of which the prefered fluctuation is chosen. When there is no choice, there is no operating."

When the whole composition of the system structure is established both by denoting all elements and components and quality and quantity of relations which link them, a certain system is determined. As quoted by Malacko [5] each system contains four basic components: structure, variables, information and system function.

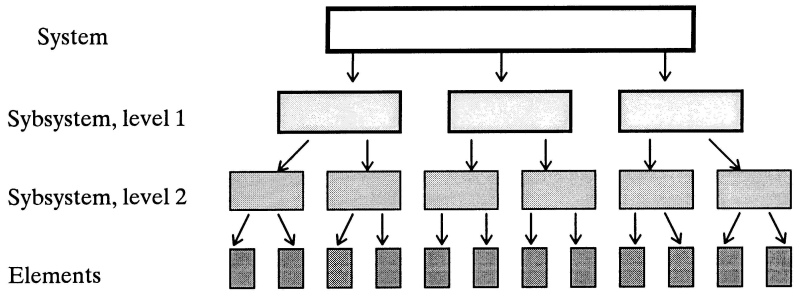
A sum of certain elements linked both inbetween and with a surroundiing, where the surrounding influences the system and on the contrary the system influences a surrounding as well, represent the structure of the system. The quality and the order of the elements within the system structure are characterized by variables. The system can

transfer from one state to another and within itself it realizes the operating function by variables. A stage of the system is characterized by variables too.

The components which circulate both between the elements of the system and within the system structure, are the information i.e. the signals. The kind, volume and quality of procedures, that is, the way of operating a system, which enables a system to transfer from one state to another is what we call the system function. There is usual change of most of the system components (structure, variables, informations) during that kind of transformation, and an often change of function as well.

2.1. System structure

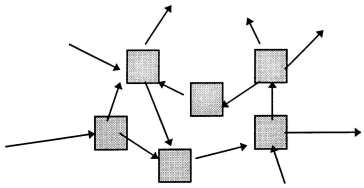
With regard to the main principle of general linkage and action there is one and only system - the Universe. By isolating parts of that universal system on the basis of different criterias, we come to notions: opened system and the system surrounding [14]. Decomposition divisioning of a system to pieces, i.e. breaking to pieces.



Scheme 2.The classification structure - three phases of decomposition (according to [15])

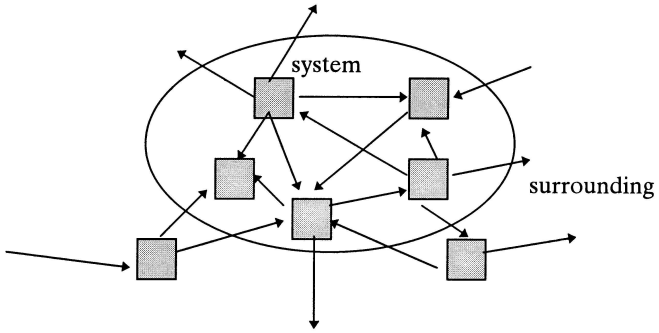
If a certain system element already is a system itself which interacts with the rest of a system, it is refered to as the subsystem. The decomposition may continues all the way down to a subsystem which on the other hand is decomposed to objects called the elementary systems while their parts called the observed system elements. The above-mentioned decomposition of the system on subsystems and elements is of importance in the analysis of system, i.e. in a partial study of extracted parts. According to [15], however, in a complex exploration of a system, i.e., while synthesizing the subsystems, the main three structures of the system i.e. classification, relation and dynamic structure are necesary explored. By integrating those structures we come to a system model. The classification structure of the system is a group of subsystems i.e. parts of the systems, provided with the relation "it belongs". It can be presented in different ways, for example with the symbols of mathematical logic, theory of communality etc. A way of its presentation is the graphic presentation (scheme 2). The relation structure of the system is a group of subsystems i.e. parts of the system, provided with the relation "it influences". This structure shows the relations among elements of the classification structure. Without relation structure these elements are only a group of unrelated subsystems and elements. A way of its presentation is the graphic presentation (scheme 3). By integrating the

classification and relation structure the static structure is made. The dynamic structure reflects dynamics, i.e. functioning of the whole system. The static structure represents only the base on which functioning goes on. The dynamic structure is the one that represents the essential unity of parts [15]. It is a group of procedures and dimensions with inbetween existed influences by which transformation of one state (input) to another (output) is enabled.



Scheme 3. The relation structure of system (according [15]).

As already mentioned each real system is a part of one universal system. This implicates the existence of relations between real system and system surrounding. Moreover, it is assumed that the system border can be imagined as a line (circle line) which circumscribes the part in which the relations between the involved objects are intensive, i.e. there are more interactions between them then in the second part in which the relations are less intensive (Scheme 4) [14].



Scheme 4. System borders (according [14]).

The points in which the surrounding influence is realized, that is, the points in which the system influence upon surrounding is realized, are refered to as the enter and exit points, respectively. The functions by which the system is influenced could be refered to as both enter (input) and exit points or simply enter (input) and exit (output). System dynamics reflects through functioning, that is, through input-output transformation. In the case that we can observe only input or output dimension, with no knowledge however, about the internal arrangement of a system, than we have so called "black box" system. On the contrary, for the system known in each and every detail we use a term "white box". The most of systems are inbetween those two different case.

2.2. System variables

According to [6] the variablesl[2] (i.e., the system coordinates) are the structural components which are characterizing the quality, state and elements arangement within the structure. Their basic role is to enable a system to recognize itself. Because of that the system is capable to influence itself in a way of transformation and rearrangement, and according to its functional characteristics.

2.3. System information

The notion "information" has the central place in cybernetics. According to [14], data is everything unused but registered and memorized somehow. Not yet before it is used as a message with purpose to increase receiver's knowledge, that is, in purpose to resolve a task, it becomes the information. So, "it is the phenomenon that enables understanding and comprehension of a thing", as emphasized by [15]. In cybernetics the information contains knowledge about the system and about the operating. The first kind of information refers to structure, organization, parameters, state and system behavior. The information about real systems is done by passive observation or by experiment, while the information on an abstractive system is done by deduction. Linking of systems, subsystems and elements is done by circulation of information, with information generated, carried, received and stored. The exchange of information between those already mentioned structural components is the communication. It is realized through signals as an information carriers. According to [6], those can be in a form of tones, cyphers, letters, impulses, a biological one etc. There are three main aspects from which those are observed. From the aspect of syntax it is not the contents but the choice of commuication system, i.e. the way and transportation technic that is of importance. From the aspect of semantics, it is observed from a view of correct interpretation of the information contents and meaning, as well as from the comprehensibility point of view. From the aspect of pragmatic, the information contribution in achieving a goal is observed.

2.4. System function

It has been already mentioned that kind, proportion and quality of procedure, that is, a way of operating a system (by which the system is transformed from one stage to another), represents the system function [6]. All structural components can be transformed. The system transformation from one state to another gives us a real insight in system behavior. The possibility of predicting a behavior depends on the nature of the system function. If the behavior is characterized by probability, with some of coincidences and if it is impossible to predict, the system is of stohastic nature. If the system operates as predicted and if we know the stimuli which influence it, as well as the

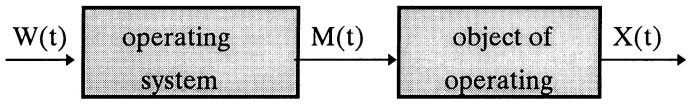
[2] When there is a need of concrete evaluation of capabilities or characteristics (characteristics, qualities, features, dimensions, factors), instead of these terms a methodology term - variable is most commonly used. In testing, the athlete is tested as a complex system, but that in a test registered, is assigned to athletes' characteristics expressed through certain responses, that is, through certain activity. Because of different manifestation level (it varies from sample to sample, from test to test) we call them the variables.

information processing, structure and the preceeding operation, the system is of determinate nature [6].

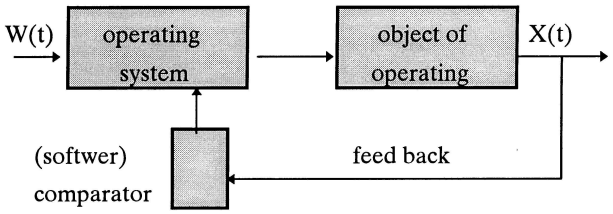
3. THE OPERATING

The operating represents the central notion of cybernetics and it is most usually defined as a transformation process of the system from one (anyone) state to another, in purpose to realize a result.

According to [15], the transformation process, that is, the input-output transformation, is most usually refered to as the system operator, realized mainly by use of different algorhythms. If the change of the system operator influence a system by causing at least one output change with no input change however, that dynamic system is operative. The operating mode, i.e. the system regulation, is a deliberate (thought out) influence upon the operator of a controlable dynamic system, in order to provoke the expected change. Therefore, as apostrofized by [15], the operation is a matter of choice, i.e. it is a selectioning of possible actions of operating, which on the other hand influence the system operator by causing at lest one output change. From the aspect of control (operating), basically there are two kind of systems: the opened and the enclosed systems. According to [14] the first kind of the operating system conducts the operative influence upon the object with no use of the information about the values of controlled variables realized in operating process. This means, that the operative influence is followed with strict, in advance settled program (Scheme 5). On the contrary, the enclosed system for operating forms the operating actions on the basis of the information about values of controlled variables. This means that the operating actions depend on system output. (Scheme 6).



Scheme 5. Opened system of operating (according to [14]).



Scheme 6. Enclosed system of operating (according [14]).

With this in mind, it should be noticed that system for operating is consisted both of system which operates (the operating system) and operated object. The operating system conducts the task of operating, which is transformation of the object of operating in a sense to develope further, to improve the function of the system etc. The object of operating is represented with the operated system. It can be an organism, process, a machine. At the enter of the system for operating the operating dimension W(t) entered from the outside is the signal (stimulus) brought in with purpose to operate the object. At the enter of the operated object the operating action M(t), which h the result of an action of the operating system is formed. At the exit of the operated object the operating dimension X(t) is formed as a result of the operating action M(t) upon the object of operating.

The main characteristic of the systems for operating is the feedback, which brings both operating W(t) and output dimension X(t) to enter of the system. Realization of the value of operated dimension is compared to expected (operating) dimension value. This kind of process is realized within the element of the operating system called the comparator. At the exit of the comparator the deviation dimension E(t), which is a sum of dimensions W(t) and X(t) is formed:

$$E(t)=W(t)\pm X(t)$$

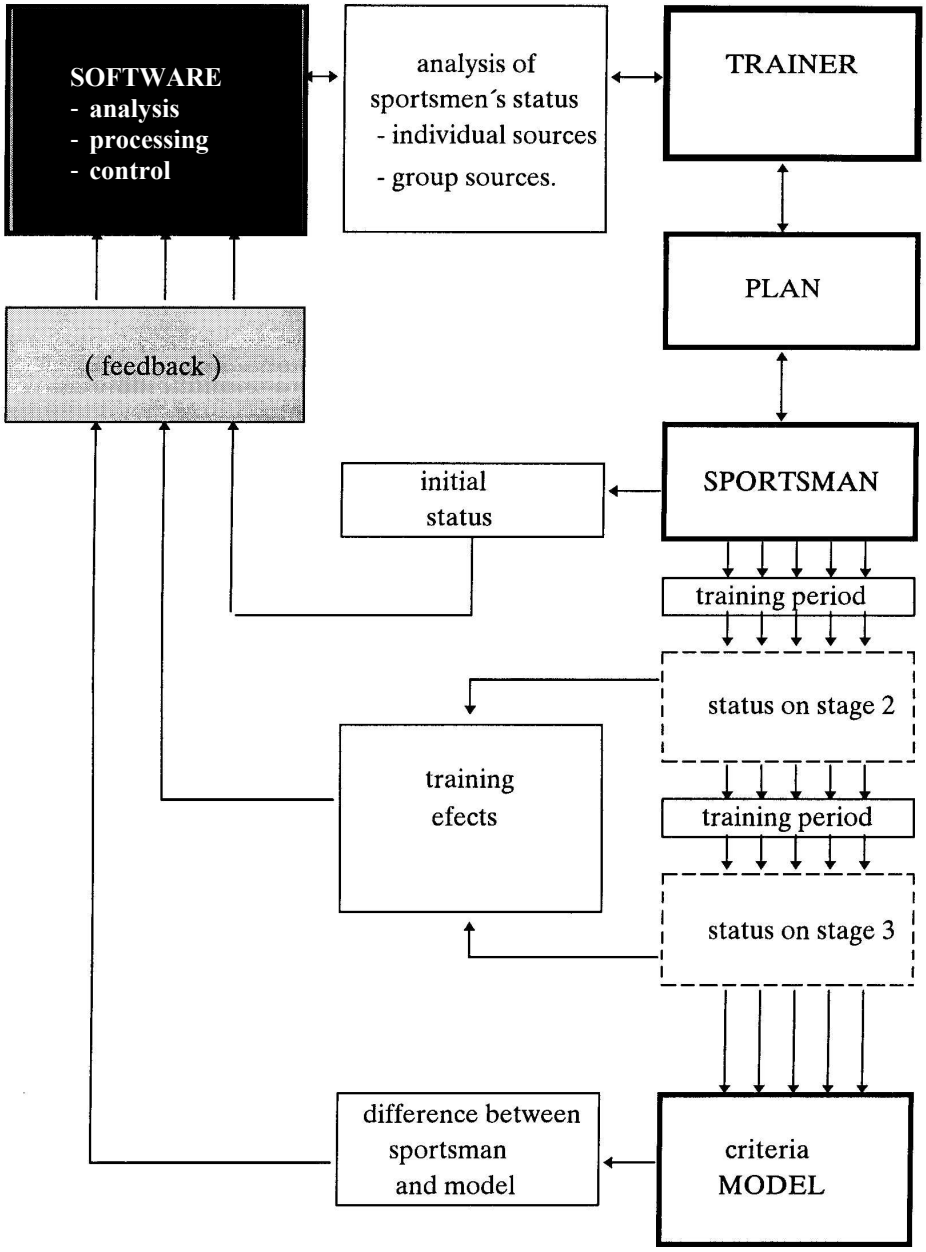
This is, as from the enter of the object the circulation of information till reaching the comparator is done by feedback which evaluates the reaction of the object to operating action M(t). On the basis of the reaction given, a new command for operating is worked out to act upon the object of operating. The feedback that way is taking over the controller role which is to enable the continuous comparison of realized dimension (variable) X(t) showed on the exit to that planned (predicted) W(t) and showed on the enter. With that, the operating system receives the both information and process them through its subsystems (comparators) to prefered shape (state) suitable to compare.

4.EXPLAINATION FOR THE SYSTEM OF OPERATING OF SPORT FORM

For explaining both place and role of software in the system for operating the sport form (SOSF)[3], modelling is necessary done, as an analogy to real system of operating. Its use is indicated because the model is basic determinant for both studies (analysis) to come and prediction of the efficiency of realizing a system and behavior of the original (real) system. In that term speaking, by application of modelling the analogue model is made which is impossible to entirely define and a black box at the same time. Not earlier than the check-control of the model is done in an experiment, with purpose to investigate whether there is or not a corresponding analogy of the original and model, defaults on the original can be noticed and thereafter corrected. On the basis of both analogy type and connection with the original, in this case, a model that is satisfactory to all criterias of structure and system functioning has been used. With that, the structure of the system as well as the suggested way of functioning of the system for operating the sport form (SOSF) is shown, enabling an insight to certain characteristics owned by a system. That is

[3] SOSF - abbrevation used in further text for expediency reasons

the abstractive (comprehending) model which is a kind of descriptivelly-constructive model (Scheme 7) when regarding the repertoar of the symbols applied.



Scheme 7. Model of the system for operating the sport form.

That kind of methodical realization of the model to wich all the essential characteristics of the real system are transported enables identification of the real system. With manysided analysis of the model, that is with use of cybernetic method for analyzing the system, the borders of the system which is presented as a black box because elements belonging to system are both extracted and prestented in a shape of a symbol (block), are determined. Subsequently, inputs and outputs, that is, all components of the system on relation cause - effect as well as the interaction between components of input and output, are defined. By determing the elementary circulation and information kind within a system, each object of a system is linked to some other and in that way is treated as the elementary system or the element. In that way the system is identified as a unique functioning totality.

As from the model it is obvious that a step decomposition of the system results with subsystem (the coach, plan of training, sportsman, criteria model, software). With subsequent decomposition of some of subsystems (a sportsman for example) both elemetary systems (morphological, functioning status) and their parts (elements, variables) are possible to determine. With that, a clear classification structure of the system, that is, a group of subsystems and elements provided with relation "to belong" is possible to sight. Determing the relation "it influence" among the elements of classification structure which without them is just a group of unrelated subsystems and elements, the relation structure is possible to determine. For instance a trainer "influence " sportsman, the analysis of feedback information "influence" trainer and so on. The dynamic structure of SOSF is represented with a number of processes and dimensions which both intearct among each-other and enable sportsman to transform from one state (enter) to another qualitatively higher state.

According to [6], when regarding to the fact that SOSF is suposed to act as expected which is because its structure, function, information processing, and preceeding behavior is known, it can be called determinant (a system with an in advance determined behavior). According to the level of interaction between the system and surrounding SOSF can be described as relatively enclosed, that is, both inputs of influence from surroundig upon a system and outputs of an system influence upon surrounding, are precisely determined [14]. From the aspect of operating SOSF is a closed system of operating which forms the operating influeces on the basis of the information about the value of operated variable. That is, the operating influence depends on system output (Scheme 6), i.e. by feedback both operating (planned) value which is the stimulus applied in a training and output (realized) value which is sportsman's reaction to applied stimuli are brought to enter of the system. The process in which the comparison of realized and planned dimension value is done, that is the process in which a deviation dimension is formed is realized in the element of the operating system called the comparator. With that, as from the enter of the object of operating which is a sportsman till comparator which both estimates sportsman's reaction to operating influence and presents a number of reports, the circulation of a number of feedback information is realized using a feedback. On the basis of the estimation of those reports and using a new worked out information, trainer influences the object of operating - sportsman. The feedback both realizes the control of the behavior of the system and insures a continuous comparison of realized value on the exit and planned at the enter.

With that the operating system receives the both kind of information and by using its

subsystem (comparator) it process them to prefered shape (more than one report) suitable to compare.

In SOSF, this kind of complex function of operator realizes especially designed software which on the basis of its performances, in the first place on mathematically-statistical processing of information and thereafter on the kind of methodically established characteristics of output reports, can improve the efficiency of the system for operating and controlling the sport form.

In the case presented, SOSF mainly is realizing its function by designed software which role in the function of the system is clear and defined as the feedback comparator role.

The use of the presented technology enables the creating and archieving of data base in a form of systematized empiric material, and also a permanent control and evaluation of sport form by insight in quantity of process of developement and changing as well. It also enables the comparison of sport status to adequate normatives and point to possible directions of further prognostics and training procedures. Practical realization of the system like that[4] in which its structure is precisely defined (the elements, algorhythms, reports) point out its determinant character which means that this kind of system function enables almost complete conformation of the final transformation of information with the transformation of information which is setted in the software structure by an applied algorhythms.

REFERENCES

1. Ahmetović, Z. (1985): Informacije u procesu sportskog treninga. Aktuelno u praksi, Novi sad, br. 1, 38-46.
2. Ban, D. (ed.) (1976): Informacioni sistemi u fizičkoj kulturi. Sport Indok centar Instituta za fizičku kulturu, Jugoslovenskog zavoda za fizičku kulturu.
3. Bechner, H., Dreissig, H., Reichstein, G. (1969): Kibernetika - Uvod u njene osnove i mogućnosti primene u sportu. Jugoslovenski zavod za fizičku kulturu, Beograd.
4. Kociol, R. (1983): Sistemi upravljanja sportskim treningom. Prevod. Sportska praksa, Beograd, br. 4, 13-16.
5. Malacko, J. (1982): Osnove sportskog treninga - kibemetički pristup. IGRO "Sportska knjiga", Beograd.
6. Marković, M. (1972): Prilaz kibernetici. Savremena administracija, Beograd.
7. Momirović, K. et al. (1987): Metode, algoritmi i programi za analizu kvantitativnih i kvalitativnih promena, Zagreb.
8. Momirović, K. et al. (1984): Kompjuterski programi za klasifikaciju, selekciju, programiranje i kontrolu treninga. Priručnik. Fakultet fizičke kulture, Zagreb.
9. Pantić, D. (1993): DOS ukratko. Institut za nuklearne nauke "Vinča", Centar za permanentno obrazovanje, Beograd.
10. Pantić, D. (1994): WINDOWS 3.1. CET Computer Equipment and Trade i Misoft, Beograd.
11. Parin, V., Bajevski, R. (1967): Uvod u medicinsku kibernetiku, Beograd.
12. Pilić, V. (1975): Kibernetika, kompjutori, obrazovanje. Ekonomski biro, Beograd.
13. Priest, S. (1988): Obučavanje studenata fizičkog vaspitanja u primeni mikrokompjutera. Fizička kultura, Beograd, vol. 42, br. 3, str. 154.
14. Simić, D. (1981): Osnovi kibernetike. Naučna knjiga, Beograd.
15. Šereš, Š. (1981): Uvod u teoriju sistema i kibernetiku. Predavanja. Ekonomski fakultet, Subotica.
16. Tomović, R. (1967): Geneza kibernetike. "Vuk Karadžić", Beograd.

[4] See Pajić Z. (1996): "The structure of computerized system for controlling the tennis players status", Master thesis, Faculty of Physical Education, Belgrade.

17. Važni, Z.(1978): Sistem sportskog treninga. NIP "Partizan", Beograd.
18. Zaciorski, V. (1967): Kibernetika i fizičko vaspitanje. Jugoslovenski zavod za fizičku kulturu, Beograd.

MESTO I ULOGA APLIKATIVNOG SOFTVERA U STRUKTURI SISTEMA UPRAVLJANJA SPORTSKOM FORMOM

Zoran B. Pajić

U ovom radu se ukazuje na značaj sistemskog uspostavljanja kontrole nad informacijama, radi optimalizacije sistema upravljanja sportskom formom, kao složenim dinamičkim sistemom. Posebno se naglalašava značaj povećanja efikasnosti podsistema povratne veze u sistemu upravljanja (kontrole), uključivanjem aplikativnog softvera kao elementa koji u tom podsistemu ima ulogu komparatora povratnih (feedback) informacija. Primenom dekompozicije, kao i sistemske analize sistema, utvrđena je delimična struktura sistema, naznačavanjem najvažnijh komponenti i elemenata, a posebno komparatora (softvera), kao i kvantiteta i kvaliteta odnosa koji ih povezuju. Korišćenjem osnovnih elemenata i pojmova kibernetike (upravljanje, sistem, algoritam, informacija itd.), integrisan je određeni broj metodički zasnovanih činjenica iz prostora upravljanja i kontrole sportskog statusa. Realizacija upravljanja sportskom formom, vrši se prema predloženom modelu sistema. Najveći deo njegove ukupne funkcije ostvaruje aplikativni softver, koji na osnovu matematičko-statističke abrade informacija, njihove analize i brze interpretacije, može obezbediti optimalizaciju, povećati efikasnost i bitno uticati na kontrolu ponašanja sistema.

KIjučne reči: *sistem, optimalizacija, softver, upravljanje*