

THE FUNCTIONAL MODEL OF OPTIMIZATION OF THE SPECIAL PHYSICAL PREPARATION OF STUDENTS IN THE PERIOD OF FLYING PRACTICE

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Annotation. It is considered approaches to optimization special physical preparation of students during the period of flying practice. For the construction of functional model of such system new information IDEF technology is utilized (ICAM Definition). The feature of technology is gradual introduction all large levels of working out in detail (decouplings). It is marked that it is expedient to carry out a decoupling before functions which will realize leaders of physical preparation and instructor of flying preparation. It is well-proven that on the stage of research of function a fundamental place is occupied by a functional design. The result of optimization of maintenance of teaching is systematization of knowledge, abilities, facilities of development and support professionally of meaningful qualities of students. The hierarchical levels of process of systematization of maintenance of teaching are recommended. It is offered directions of realization of functional model through conditioning optimization of pedagogical activity of teacher.

Keywords: optimizations, student, flying preparation, special physical preparation, functional model.

Introduction

Reorganization of Air Forces of Ukrainian Armed Forces put especially keenly the question about improvement of military specialists training's quality. First of all it concerns the most complicated kinds of professional activity, to which the profession of military pilot relates in full. Review of scientific papers, reports, monographs [2, 3, 5, 8], devoted to training of flight personnel, permits to regard training process as consisting of theoretical, simulating training, psychological, psycho physiological, physical and directly flight training components. Focusing of pedagogical influence's results of all six training kinds determines professional preparedness.

Professional training of pilots relates to those components of aviation system, in which great number of dangerous factors are hidden and revelation of these factors in due time is the essence of flights' safety control through improvement of educational process [5].

That's why searching of ways of pilots psycho physiological and physical abilities', which are the ground of professional activity, maintenance by means of special physical training (SPT) is an urgent task of cadets flight training's modern organization.

As our research has showed, the problem of flight personnel's physical training on different stages of professional formation and improvement at military higher educational institution is not a new or insufficiently studied one (A.A. Gorelov, O.M. Kernitskiy, M.S. Korolchuk, R.N. Makarov). Nevertheless, reformation of education requires regarding this problem from the position of modern technologies of education quality improvement in compliance with new governmental educational standards.

The researches, which have been being carried out since the day of Ukrainian Air Forces creation, practically did not touch the question of pedagogical process optimization in the field of pilots' physical training in the period of flight training.

Analysis of scientific pedagogical literature on the researched problem [1, 7] points, that pedagogical process optimization remains to be the factor, which intensifies pedagogical process, raises its effectiveness per every unit of time. That is, there has appeared a necessity to research SPT system from the position of idea of optimization.

At research stage of SPT system and its functioning efficiency's analysis the author offers functional modeling.

At present, for building of functional models of big systems new information technologies are used, which base on powerful computational means. Such technologies as IDFF (ICAM Definition) relate to them [6, 9, 10].

Diagram of the highest level is called a context one. On it the system's main function in the whole (target of function) is presented as well as arcs, which are a complete set of external interfaces. Besides, the purpose of model's creation and a person or organization, whose approach is reflected by this model, are obligatory depicted on the diagram. One of the most important peculiarities of IDFF technology is gradual introduction of progressively higher levels of detailing (decomposition) as the diagrams, reflecting model, are being created.

Functional block of context diagram, which presents system as a single module, is detailed on other diagram with the help of several blocks, connected by interface arcs. They are main sub modules (sub functions) of single output module. Each of sub modules can also be decomposed for the further presentation.

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Purpose, tasks of the work, material and methods

The purpose of the research: construction of functional model of cadets' special physical training's organization in the flight practice period on the base of optimization conception.

The methods and organization of the research. For solution of the posed problem theoretical analysis and generalization of literature sources, systemic approach and technology of complex systems' (IDFF-technology) functional models' creation were used.

Results of the research

Construction of functional models by IDFF technology (models, which reflect actual status of the tested object, i.e. SPT) requires: first of all large resources, time, qualified specialists; secondly, availability of special software, supporting systemic principles of model creation.

Creation of functional model makes it possible to estimate available functions of sub systems and elements, compare them with standard functions, to make conclusion about efficiency of system's functioning, to solve a number of practical tasks, connected with its optimization's possible directions.

Functional hierarchic IDFF-diagrams permit also to divide authority for system's components, to organize their interconnections.

Figures 1-4 illustrate a variant of construction of CPT optimization's functional model fragment.

In this very case decomposition process has been realized for blocks A0, A1, A2 and A3 up to corresponding hierarchic level. The quantity of decomposition levels is determined by the head of development process. It is purposeful to carry out decomposition before functions, realized by physical training coaches and flight training instructors.

The purpose of model's creation is to analyze what functions shall ensure the process of social physical training optimization in the period of flight practice and how these functions shall be interconnected in order to develop recommendations concerning improvement of flight training system's efficiency.

In fig.1 there is presented context IDFF diagram (first level of decomposition) of PHT process's optimization, in which components are depicted as rectangles.

The target of special physical optimization (fig.1, arrow- exit) is reaching of cadets' readiness for the conditions of flight activity for the assigned time, reasonable efforts, cadets' and teachers' time.

Activities on solution of mentioned above optimization problems and reaching its targets (fig.1, arrows above) are regulated by the following documents:

- "Course of initial flight training of sports aviation clubs";
- "Service regulations of Armed Forces of Ukraine";
- Order of Ministry of Defense of Ukraine, No.202, dt. 26.04.2007 "On perfection of planning and organization of physical training at military higher educational institutions of Ukrainian Armed Forces and at military educational units of higher educational institutions";
- "Manual of physical training";
- "Instructors' manual on organization and fulfillment of cadets' flight training";
- "Procedure of ground and flight training on aircraft Л-39";

At input (arrows on the left): academic plan of flight specialties cadets' training; resources (material, financial, time); initial level of cadets' physical preparedness; physical culture-health improving and sports technologies.

The function of special physical training's optimization is to be carried out by the head of military higher educational institution.

Regarding pedagogical process as specially organized interactivity of pedagogues and cadets, which is directed to solution of developing and educational tasks, it is purposeful to underline optimal components quantity as per principle of sufficiency from the point of view of their practical application.

Main general components, without which efficient functioning of PST is impossible, include: content of training;

- activity of the head of military higher educational institution;
- activity of cadets' and SPT trainings supervisor;

The result of training content (block "Optimize SPT content") is systematization of knowledge and skills, means of cadets' professionally significant abilities development and support. The given documents (academic and working training programs) are the basis of realization of block's «Optimize activity of military higher educational institution» function. At the block's output there must be planning documents, which regulate SPT process, which are required for block "Activity of cadets' and SPT trainings supervisor". In the process of the block's realization, resource-organizational restrictions, offers concerning training content, which shall be considered during planning, are established. SPT process optimization is carried out under the guidance of head of military higher educational institution with active participation of the head of physical training and PST department, heads of services and sub units.

The basis of training content's optimization is curriculum (model of specialist's training), developed on the basis of specialist's activity model.

The most efficient mean of discipline optimization is systematization of academic materials.

The process of systematization of training content is an hierarchic one (see fig.2) and includes several levels:

- formation of military specialist's ability to solve problems and tasks in the process of his flight activity by SPT means;
- formation of skills, ensuring military specialist's ability to solve problems and tasks in the process of his flight activity by SPT means;
- formation of content modules (subjects);
- formation of training elements (training questions);
- construction of pedagogical tasks' set.

Block "Optimize activity of the head of military higher educational institution" (see fig.3)

Government control the process of physical education, authorizing central body of executive branch which deals with problems of physical culture and sports and other executive central bodies in the sphere of physical culture

and sports. General organization of educational-training process of physical education and mass sports at military educational institution is carried out by its head, who ensures:

- making decisions concerning creation of necessary conditions for practicing physical education and mass sports;
- including compulsory physical training (4 hour weekly) in curriculums of all specialties for the whole period of study, excluding the last graduation semester;
- creation of structural sub units on physical education and mass sports and their provision with the required staff, material & technical base, equipment and stock;
- control over the cadets' state of health and physical education;
- execution of other authorities, envisaged by current legislation, concerning development of physical education and mass sports at higher educational institutions;

Decision of the head of university about organization of physical training is the basis for planning.

In the course of physical training planning it shall be formed the following:

- list of main tasks, final (expected) status of readiness for practical implementation as per the purpose of sub unit;
- analysis of physical training possibilities at the university;
- development of physical training measure for servicemen for the planned period.

Decision and order to organize physical training, approval of planning documents, regulating the process of physical training's organization are the results of physical training planning.

After making administrative decision, the process of controlling over physical training does not stop but transfers to realization phase, i.e. in the stage of its direct implementation into practice. The realization of the decision requires activating of its motivational, organizational, executive and control functions. Realization process of administrative decisions consists of:

- information of executors about the decision;
- coordination of the executors' activity;
- analysis of the results of the posed tasks and control over executors' activity;
- summarizing.

Fig. 4 illustrates the essence of the activity of coach and cadets, regarded as per principle of optimality. Creation of optimization conditions of physical training coach's pedagogical activity is connected by us with development and realization of coach's activity functional model. The principles of implementation of this model base on coaches' individual features and organizational-pedagogical peculiarities of academic process. In other words, realization of functional model of physical training teacher is the main but not the only condition of pedagogical activity optimization. With this, it should be noted that every model's component includes own conditions of optimization. Besides, model includes realization conditions and factors, ensuring its maximal optimization.

The offered by us functional model of physical training teacher's activity is a spread basic diagram and detail description of its components. Thus, functional model is an arranged, interconnected diagram and description of components of physical training teaches activity system: subjects of activity, kinds of activities, pedagogical activity technologies, conditions and factors of its optimization.

Within the frames of academic process in physical training at military higher educational institutions, cadets, SPT and teachers are the subjects of activity. The main kind of integral activity of higher educational institution's teacher are teaching, educational, scientific, methodological work and the work on his advanced training. These kinds are universal and relate to all kinds of higher educational institutions. Their universality expands to all disciplines of higher educational institutions, including physical training in military higher educational institution. Speaking about pedagogical conditions and optimization factors of physical training teacher's activity optimization we cannot but stress cadet's interest in receiving knowledge and skills. Purposeful, motivated training of a cadet is one of decisive pedagogical conditions, which optimize the activity of a physical training teacher. Only such training can bring positive results, positive shifts in knowledge levels and its organization, which would permit to speak about quality of physical training teacher's work, its efficiency. Cadets represent a contingent, which create environment for realization of conditions for physical training teacher's activity optimization.

Summary

It has been proved that on research stage fundamental place is taken by functional modeling. Functions shall ensure the process of optimization of special physical training in the period of flight practice. These functions shall be interconnected. It will permit to develop recommendations directed to perfection of flight training system's efficiency.

For construction of functional model of such system, new informational IDFF technology was used. An important peculiarity of the technology is a gradual (coinciding with creation of functional diagrams, reflecting the model) introduction of higher and higher detailing (decomposition) levels. Functional model of SPT system's optimization has also been developed.

The prospects of our research envisage designing of technology of cadets' physical training on the base of activity approach.

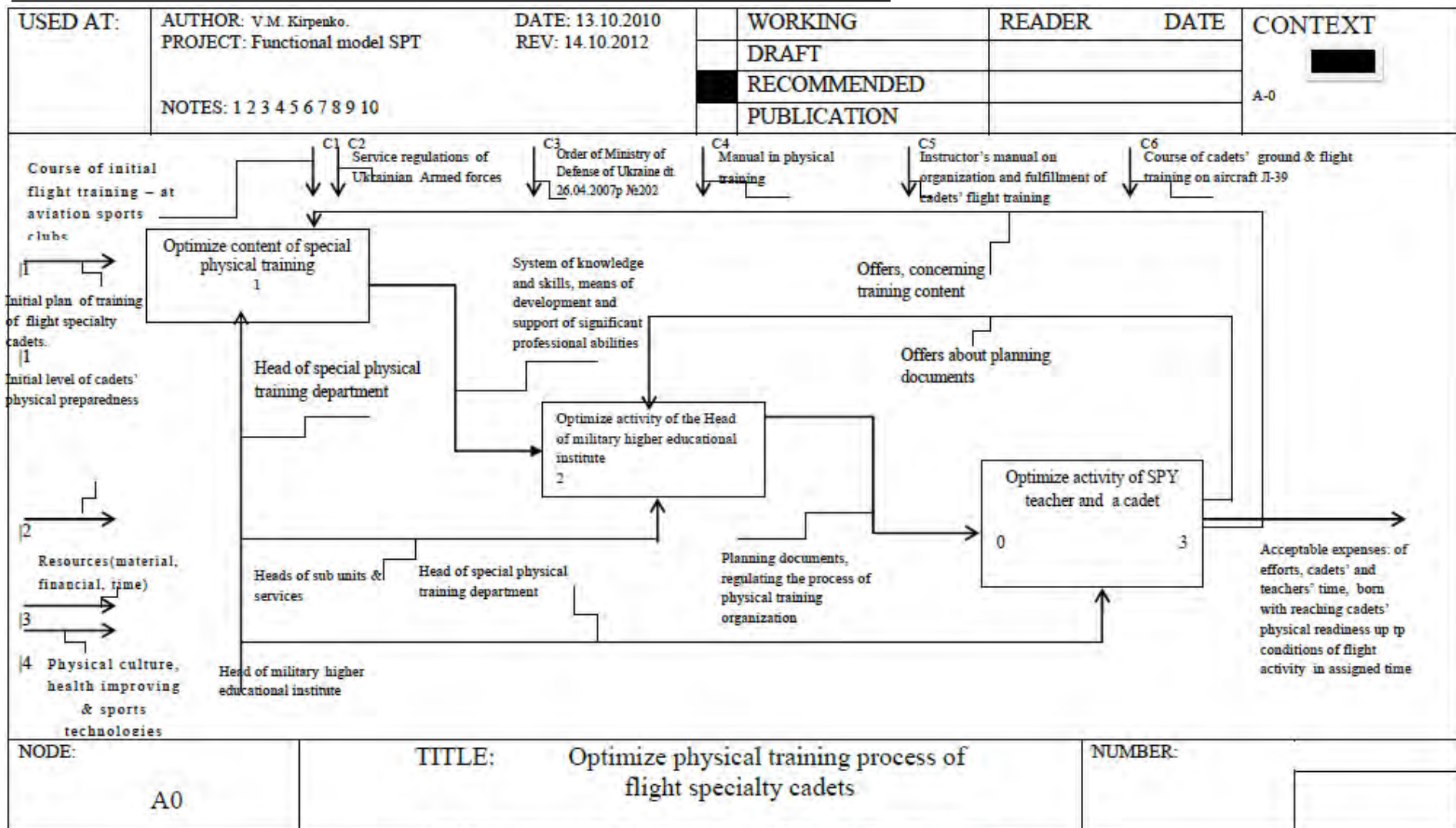


Fig.1 Functional model of SPT optimization. First level of decomposition

USED AT:	AUTHOR: V.M. Kirpenko PROJECT: SPT functional model	DATE: 14.10.2012 REV: 17.10.2012	WORKING DRAFT	READER	DATE	CONTEXT
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			PUBLICATION			A-0 <input type="checkbox"/>

The diagram illustrates the process of training content systematization through five sequential stages:

- 0** Formation of a serviceman's ability to solve problems and execute tasks in the process of his SPT
- 1** Formation of features, ensuring a serviceman's abilities to solve problems and tasks of flight activity by SPY means
- 2** Formation of content modules (subjects)
- 3** Formation of training elements
- 4** Construction of pedagogical tasks set

Supporting documents and resources include:

- Course of initial flight training at aviation sports clubs
- Service regulations of Ukrainian Armed Forces
- Order of Ministry of Defense of Ukraine 26.04.2007 . № 202
- Manual in physical training
- Instructor's manual on organization and fulfillment of cadets' physical training
- Course of ground and flight training on aircraft Il-39

Inputs and outputs of the process:

- Inputs:** Initial plan of flight specialty cadets' training, Initial level of cadets physical preparedness, Resources (material, financial, time), Physical culture-health improving & sports technologies, Head of military higher educational institute.
- Intermediate Output:** System of knowledge, skills, development and support of professionally significant abilities.
- Final Output:** Acceptable expenses of cadets' and teachers' efforts, time, with reaching of cadets' physical readiness to flight activity for assigned time.

Additional text: Виховачі кафедри

NODE: A1	TITLE: Optimize content of special physical training	NUMBER: <input type="text"/>
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Fig. 2 Block "Process of training content systematization"

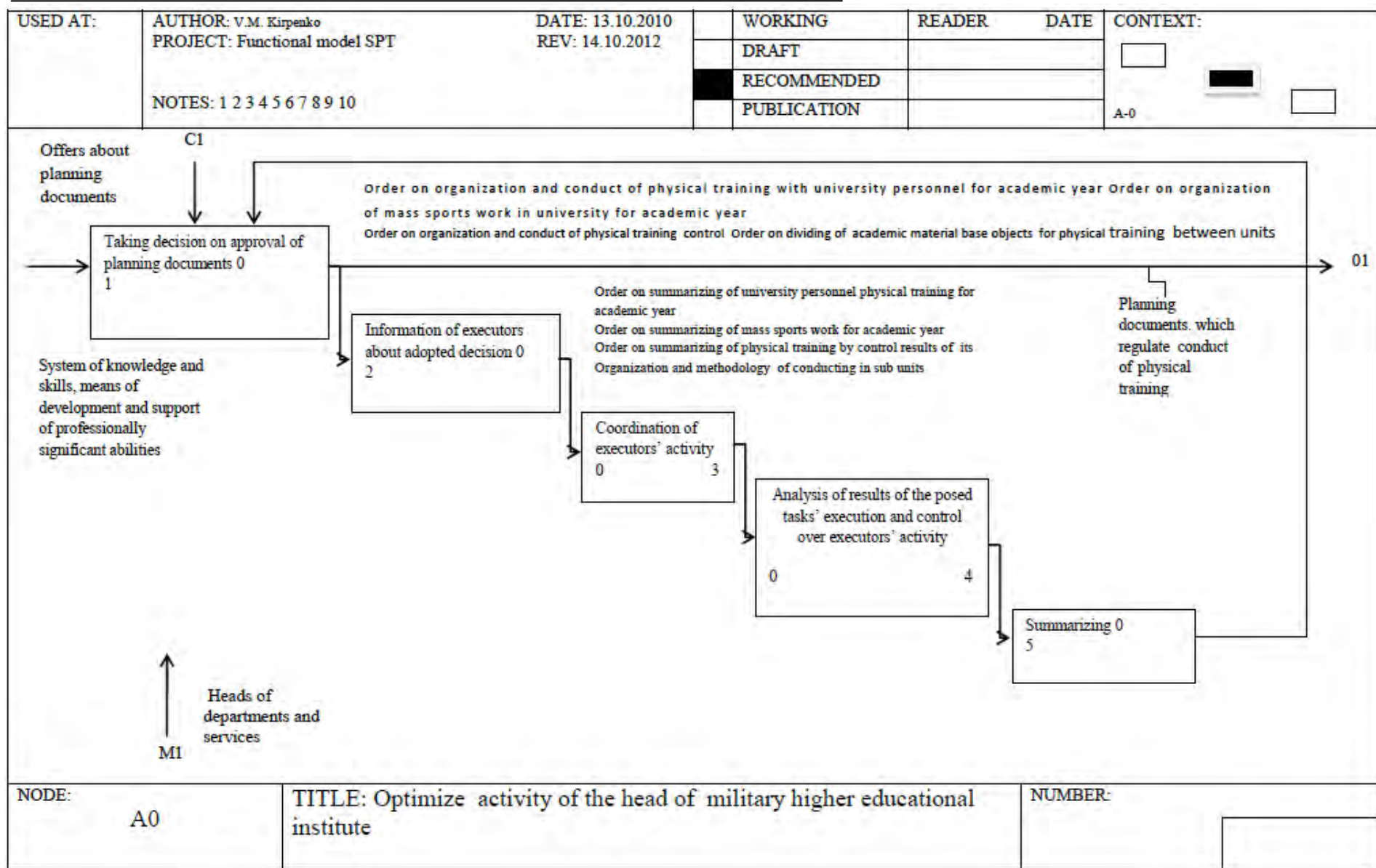


Fig. 3 Block “Optimize activity of the head of military higher educational institution”. The second level of decomposition.

USED AT:	AUTHOR: V.M. Kirpenko	DATE: 14.10.2012	WORKING	READER	DATE	CONTEX	
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	NOTES: 1 2 3 4 5 6 7 8 9 10						
<p>Technology of discipline's teaching</p>							
NODE:	TITLE: Optimize SPT teacher's and cadet's activity				NUMBER:		
A3					<input type="checkbox"/>		

Fig. 4 Essence of pedagogical activity of physical training teacher and cadet

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