

Methodology Of Individualization Of Physical Loads Based On Monitoring The Functional State Of Students

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Abstract. The article examines the problem of funksional monitoringga tayangan individual yuklama metodikasi within the framework of sport pedagogy, physical culture theory and health-oriented higher education. The relevance of the study is determined by the need to transform physical education from a predominantly normative lesson into a pedagogical environment that develops health literacy, independent exercise habits, movement safety, social interaction and self-regulation. The object of the research is talaba-yoshlarning yurak-qon tomir, nafas olish, mushak chidamliligi, koordinatsion tayyorgarlik va tiklanish ko'rsatkichlari; the subject is mashg'ulot yuklamasini yurak urish tezligi, subyektiv zo'riqish, test natijalari va tiklanish belgilariga qarab moslashtirish metodikasi. On the basis of theoretical analysis, comparative pedagogical generalization and model design, the article proposes kirish diagnostikasi, haftalik monitoring, yuklama zonalarini belgilash, xavf belgilarini nazorat qilish, mikrotsiklni tuzatish va yakuniy refleksiv baholashdan iborat individualizatsiya algoritmi. The scientific novelty is connected with talabalarning jismoniy tayyorgarligini bir xil normativlar bilan emas, balki funksional holat dinamikasini aks ettiruvchi ko'p mezonli monitoring orqali baholash va shu bahoga mos mashg'ulot trayektoriyasini qurish. The results clarify the structural components, pedagogical conditions and expected educational effects of the proposed approach. The practical value lies in the possibility of using the model in higher education institutions for lesson planning, differentiated workload management, student reflection and sustainable physical activity promotion.

Keywords: functional monitoring, training load, individualization, students, heart rate, recovery.

Introduction.

First of all, the social function of physical culture in a higher educational institution should be rethought: as the gap between the auditorium and the gym decreases, the student approaches the conscious management of his body, health, mental stability and working capacity. The student contingent is not the same: in one group there are young people with sports school experience, students who come with chronic fatigue, representatives of directions with a strong technological sitting regime, and those who have a negative stereotype about physical activity. Therefore, the value of the lesson is not in who passes the standard faster, but in the movement culture, safe exercise competence and long-term health motivation of each student. The issues of mass physical education, youth coverage and use of sports infrastructure are priorities in the sports policy of Uzbekistan, and physical culture in higher education is one of the scientific and pedagogical pillars of this system [1; 2]. At the international level, the World Health Organization defines regular physical activity, muscle-strengthening exercises and reducing sedentary time as essential for health for children, adolescents and adults [3; 4]. UNESCO defines quality physical education as an educational field that develops not only sports skills, but also life skills, inclusive participation and social responsibility [5]. The importance of functional monitoring is that when heart rate, recovery rate, subjective tension and quality of technical performance are considered together, the real potential of the student is revealed more clearly. Digital sensors and simple pedagogical tests do not exclude each other; on the contrary, they bring the teacher's experience of visual assessment closer to evidence [6]. Based on this, the purpose of this article is to identify the theoretical and methodological foundations of the individual loading methodology based on functional monitoring, to express it in the form of a pedagogical model suitable for use in higher education, and to substantiate the mechanisms of practical implementation. The objects of the study were selected as the cardiovascular, respiratory, muscular endurance, coordination training and recovery indicators of students, and the subject of the study was defined as a methodology for adjusting the training load depending on heart rate, subjective tension, test results and signs of recovery. The scientific hypothesis of the article is as follows:

if physical education training is organized as a system that combines diagnostic, targeted planning, differential loading, safety, motivation and reflection components, then not only the physical fitness of students, but also their responsible attitude to health and independent motor activity will increase. The scientific significance of the topic at the DSc level is precisely that it requires viewing the teaching methodology not as a set of separate exercises, but as a multi-level pedagogical system connecting the institute, department, teacher, student, sports infrastructure and healthy lifestyle policy. What further deepens the relevance of the topic is that physical education today is not just a set of exercises performed in the gym, but an integrative educational system that affects the biological, psychological, social and professional preparation of the younger generation. In the daily lives of students, factors such as prolonged sitting, excessive use of transport, spending a lot of time in front of the screen, improper rest and irregular nutrition reduce the level of physical fitness; these factors are directly visible in the lesson process, since the same task can cause easy adaptation in some students, and excessive stress in others. Therefore, the article views physical culture not at the level of a general health slogan, but at the level of a system of specific pedagogical decisions: which exercise is chosen, why it is chosen, to whom and in what volume, what danger signs are observed, how the student understands his condition and how he moves on to independent activity after class. In higher education, the importance of this issue increases even more, because the student is no longer a schoolboy; he must make independent decisions, manage his time and maintain a health resource suitable for his future professional activity. In addition, the status of physical culture in higher education is often overshadowed by general professional disciplines, as if this discipline serves only to fulfill physical standards. In fact, for any profession, a healthy spine, functional reserve of the cardiovascular system, stress management through physical activity, teamwork and a responsible attitude to oneself are hidden but powerful factors of labor productivity. Therefore, physical culture should be interpreted in a modern university not as a secondary auxiliary activity, but as a fundamental pedagogical resource serving to maintain and develop human capital. The relevance of functional monitoring is that the student's appearance or previous sports experience do not fully reveal his real state in a given lesson. Sometimes a student athlete comes with low preparation due to lack of sleep, while a seemingly sluggish student shows steady progress; therefore, pedagogical decisions should be based on observation and indicators, not assumptions.

Methods. The research methodology was based on a theoretical analysis of the methodology of individual loading based on functional monitoring, a comparative generalization of regulatory and legal documents, international recommendations, sources of sports pedagogy and higher education practice. Methodologically, the article was aimed at designing a scientifically based model rather than artificially absolutizing the empirical result; in this, a systematic approach, activity theory, a competency-based approach, person-oriented education, health-improving pedagogy and the principles of periodization of sports training were used together. At the first stage of the analysis, the normative framework on the topic was reviewed, including documents on state support for physical education and sports, training of specialists, attracting young people to sports and the development of a healthy lifestyle [1; 2]. At the second stage, the principles from the WHO, UNESCO, ACSM and sources of sports psychology and sports medicine were analyzed and adapted to the national higher education conditions; in this case, the criterion was not the direct transfer of the recommendation, but its compatibility with the curriculum, lesson time, group size, gym capacity, student motivation and safety requirements [3; 4; 5]. At the third stage, the components of the pedagogical model were distinguished: the goal block, the diagnostic block, the content block, the methodological block, the control-evaluation block, the reflexive block and the organizational-pedagogical conditions block. Indicators were determined for each block: endurance, strength, flexibility, coordination and agility in physical training; understanding the purpose of the exercise, knowledge of safety rules and recognition of signs of fatigue in health literacy; internal motivation, self-assessment and sustainable participation in the motivational sphere; partnership, communicative culture and ethical management of competition in the social sphere. Since it is not enough to rely only on the final standard in the assessment, process assessment, progress assessment and reflexive assessment were combined; there is a pedagogical subtlety here: a strong student should be evaluated not only for showing high results, but also for scientifically managing his abilities, and a student at the initial level should be encouraged for showing real progress. A three-layered diagnosis was recommended for

functional monitoring: simple pedagogical tests, a subjective stress scale and, if possible, digital tools that record heart rate or recovery dynamics. The load zones were conditionally divided into adaptive, developmental, highly controlled and recovery zones; the goal here is not to overexert a strong student or to marginalize a weak student, but to bring each student into the optimal pedagogical calling area. Thus, the methodology led to the development of an individualization algorithm consisting of initial diagnostics, weekly monitoring, determination of load zones, control of risk indicators, correction of the microcycle and final reflexive assessment, and served to identify the pedagogical conditions necessary for the application of this model in real teaching conditions of higher education. The limitation of the study is that the article is conceptual and methodological in nature; therefore, the proposed model can be further tested through experimental testing, control and experimental groups, dynamic tests, and statistical analysis at the next stage. However, the advantage of the conceptual model is that it provides the teacher with not a ready-made motto, but a practical algorithm for planning, monitoring, adjusting and evaluating the lesson on a scientific basis. In methodological design, a balance was maintained between scientificity and practical application: the model should not become an overly complex theoretical construct, but at the same time not turn into a simple set of instructions. Therefore, each methodological decision was checked through three questions: first, does it take into account the real physical condition of the student; secondly, does it allow the teacher to make quick and safe decisions during the lesson; thirdly, does it affect the student's long-term independent movement activity. Based on these questions, a microalgorithm for planning a training session was formed: introductory observation, brief explanation of the goal, demonstration of the movement technique, initial light attempt, main load, intermediate feedback, simplification or complication, final recovery and reflexive conclusion. This algorithm can be adapted to different sports, faculties and group conditions, since it relies not on strict exercise names, but on pedagogical functions. In the methodological process, an observation sheet, a short interview, self-assessment questions, expert assessment of exercise technique and, if necessary, simple digital recording methods can be used. In this case, the ethics of scientific research should be maintained, the student's personal data should not be disclosed, and physical indicators should not become a means of social comparison. Each method has its own task: the test shows the level, the interview reveals the motive, the observation identifies technical errors, and reflection reveals the student's internal attitude. In this regard, the methods were considered as a complementary diagnostic complex. The monitoring card can record heart rate, recovery time, subjective tension, exercise technique, activity in the lesson and final state signs. This card does not replace a medical diagnosis, but it gives the teacher a more reliable direction in managing the pedagogical load.

Results. As a result of the analysis, a multi-component pedagogical model was developed as the main scientific result of the individual loading methodology based on functional monitoring, and its content was adapted for physical culture classes in higher education. At the heart of the model is an individualization algorithm consisting of initial diagnostics, weekly monitoring, determination of load zones, control of risk signs, correction of the microcycle and final reflexive assessment; these blocks are not separate mechanical parts, but act as a single cycle that controls the content, load, communication and assessment of the lesson. The first result is the hierarchy of goals: the general goal is to increase the student's physical activity, while the specific goals are to develop movement qualities, strengthen health literacy, teach safe exercise, strengthen social interaction, and form the competence of drawing up an independent training plan. The second result is that diagnostics are not an auxiliary element of the lesson, but rather the initial mechanism for determining the content; if the student's level of preparation, signs of fatigue, motivation, and previous sports experience are not taken into account, even a well-chosen exercise can give the wrong load. The third result is that three levels of differentiation are proposed: the minimum safe participation level, the developmental norm level, and the level of expanded sports training; such a separation does not violate equality in the lesson, but, on the contrary, ensures pedagogical justice, since each student receives a task that corresponds to his or her capabilities. The fourth result — integrative assessment criteria were developed: the result, progress, quality of technique, theoretical understanding, safety compliance, cooperation in the group and reflexive conclusion are considered together. The fifth result — a functional map of the teacher's activity was proposed: he selects the exercise, foresees the danger, creates a motivational environment, manages the load, corrects the error,

records the result and forms the student's independent movement experience. The sixth result — reflection was defined as a mandatory methodological component in the final part of the lesson; after the exercise, the student understands not only that he is tired, but also what he has learned, which movement was safe, which sign indicates excessive strain and what he needs to improve in the next lesson. As a result of the individual loading methodology, four types of student profiles were distinguished within the group: students with high preparation and needing a more complex task, students with an average level of stability, students with low preparation and needing adaptation, and students who need a reduced load due to temporary fatigue or health symptoms. The monitoring result does not slow down the lesson; on the contrary, it shows the teacher which exercises to continue, which to reduce, and when to give a recovery pause. Based on the results, a general formula for lesson effectiveness was proposed: a physical education lesson will have a sustainable pedagogical effect only when a scientifically based goal, realistic diagnostics, appropriate load, safe technique, motivational environment, and reflective assessment are combined. If one of these components is missing, the system will weaken: a lesson without a goal turns into a set of exercises, a lesson without diagnostics into guesswork, a lesson without motivation into an obligation, and a lesson without reflection into short-term fatigue. Therefore, the results developed in the article can serve as a methodological basis for improving subject plans, lesson designs, independent training assignments, and student progress sheets in the practice of the department. A sample lesson structure was also determined to implement the model in practice. The introductory part includes observation of the student's condition, a short motivational comment, a note on safety, and exercises for general activation of the body; this part can last 10-15 minutes, depending on the content of the lesson. The main part offers three levels of movement tasks appropriate to the topic: the basic level serves to safely master the technique, the developmental level serves to improve physical quality, and the extended level serves to make it more athletic. The final part includes recovery exercises, a brief analysis, the student's assessment of his own condition, and the next independent task. The result indicators are also divided into two types: obvious indicators - time, distance, number of repetitions, stability of technique; hidden, but pedagogically important indicators - self-confidence, understanding of the purpose of the exercise, safe behavior, positive attitude to the lesson, and readiness to continue independently. Such a two-tiered system of indicators does not limit the result of the lesson to sports standards. As another result of the model, a three-stage implementation mechanism was developed that can be used at the department level: a methodological seminar for teachers at the preparatory stage, reviewing existing lesson developments and determining safety criteria; at the main stage, the gradual introduction of diagnostic, differential loading, and reflexive assessment elements in selected groups; at the final stage, summarizing indicators such as student opinion, attendance, progress, complaints or injuries, and interest in independent training. This mechanism does not imply a forced replacement of the model in one day, but a natural introduction through scientific observation, methodological discussion, and practical adjustments. It was also justified to create a set of short instructions, a bank of exercise options, safety notes, student self-assessment sheets, and competency indicators by topic for educational and methodological support. When interpreting the results, it was proposed to consider the effectiveness of the lesson at the semester, academic year, and long-term levels: at the semester level, the student demonstrates indicators of correct execution of exercises and regular attendance at the lesson; at the academic year level, a steady increase in physical qualities, motivation, and readiness for independent training can be observed; at the long-term level, such results as independent decisions regarding a healthy lifestyle, inclusion of sports or recreational activities in the lifestyle, and management of professional fatigue through physical activity appear. Therefore, the effectiveness of the model should be assessed not only by the visible activity in the lesson, but also by the change in the student's behavior outside the lesson. As a result of the individualization algorithm, the principle of 'one group - the same task' was proposed in the assignment of the load, instead of the principle of 'one goal - different paths'. This principle maintains the general order in the lesson, but provides a level of development appropriate for each student.

Discussion. In the process of discussion, the theoretical and practical value of the individual loading methodology based on functional monitoring is explained, first of all, by the fact that it can link physical education lessons not to narrow sports results, but to personal health, social competence and professional work skills. Today's higher education student lives in conditions of a rapidly changing labor market, digital lifestyle,

mental pressure and lack of movement; therefore, physical education should not be a simple subject in his weekly schedule, but a strategic subject that restores the body, educates will and forms a culture of self-control. Unfortunately, in practice, sometimes the content of the lesson does not go beyond the chain 'we did the exercise - we passed the standard - we gave a grade'; although such an approach is organizationally convenient in the short term, it does not guarantee the student's independent physical activity in the long term. The advantage of the proposed model at this point is that it links the exercise with a goal, understanding, motivation, safety and reflection; in other words, the student knows what he is doing, understands why he is doing it, and then learns how to continue it independently. It is widely proven in international sources that physical activity has a positive effect on health, but the most important question for higher education methodology is: how to translate these recommendations into a real 80-90-minute lesson process, how the teacher manages it in conditions of a large group, and how the student transforms it from a mandatory subject into a personal need [3; 4; 5]. This article attempts to fill this gap: it does not mechanically repeat the clinical recommendation, but translates it into the language of goals, methods, communication and evaluation of sports pedagogy. Another important aspect of the discussion is the professional competence of the teacher; the physical education teacher is not an instructor who is limited to demonstrating exercises, but acts as a diagnostician, methodologist, psychological supporter and safety engineer. Without fulfilling this requirement, it is difficult to improve the quality of the lesson, because a modern physical education teacher must combine anatomical and physiological knowledge, pedagogical communication, digital literacy, assessment culture and a person-centered approach. There is also a cautious side to monitoring: indicators should serve to show the student's progress, not to reduce his personal dignity. If the heart rate or test result is transformed into a rating and becomes a means of discrimination in front of the group, the technology causes pedagogical harm; therefore, monitoring must be accompanied by confidentiality, explanations and individual recommendations. Three organizational conditions are important for implementing the approach proposed in the article: first, there must be a single methodological concept at the department level; second, lesson plans should be structured not only by the name of the subject, but also by competencies and indicators; third, practical modules on sports medicine, digital monitoring and pedagogical psychology should be strengthened in the process of teacher training. Also, simple, unbureaucratic tools for monitoring students' independent training - a personal progress sheet, a weekly activity diary, video feedback or small group project assignments - can be effective. Most importantly, a physical education lesson should not be a punitive normative space, but an environment that teaches a scientifically based movement culture; in the gym, the student should not only sweat, but also think, because conscious movement is the most economical and longest-lasting training method. In this sense, the article can be assessed as a scientific and methodological platform aimed at modernizing physical education in higher education, increasing the health-improving value of the lesson and ensuring the integral development of the student's personality. Of course, some problems may arise when implementing the proposed approach. The first problem is the numerical size of the groups; in such conditions, an individual approach looks beautiful on paper, but difficult in practice. However, individualization does not mean allocating a separate coach for each student; it is also carried out by grading exercise tasks, pre-determining the risk group, working in pairs and small groups, and establishing student self-control. The second problem is the usual stereotypes in assessment; high evaluation of only a strong result excludes a student at an early stage, while evaluation of only participation weakens sports aspirations. Therefore, combining results and progress in assessment is the most optimal way. The third problem is the methodological load of the teacher; the new model requires additional planning, but this planning prevents chaos in the lesson, the risk of injury, and a decrease in motivation. Thus, initial work serves subsequent pedagogical effectiveness. The fourth problem is the distance between scientific research and everyday classroom practice; many methodological ideas look good in the article, but are tested in the gym with time, equipment, group discipline, and student motivation. Therefore, the strength of the proposed model lies in its flexibility: it does not provide a mandatory single list of exercises, but allows the teacher to choose the movement task and control its level of complexity based on the purpose of the lesson. The fifth problem is the lack of cooperation with parents, the dean's office, sports clubs and medical services; the effectiveness of physical culture in higher education cannot be solved only within the department, it is associated with student

housing, mass sports events, a healthy eating culture, psychological services and the meaningful organization of students' free time. In this regard, the approach put forward in the article encourages us to see the department not as a closed teaching unit, but as a scientific and methodological center that forms a healthy university environment. The introduction of monitoring requires the teacher not to chase numbers, but to compare numbers with pedagogical intuition. The best method is to enrich simple observation with an objective signal, but not to interpret the student's personal situation without dialogue.

Conclusion. The conducted theoretical and methodological analysis showed that the individual loading methodology based on functional monitoring can be an important scientific and practical basis for the qualitative renewal of physical education classes in higher education. The article defines the cardiovascular, respiratory, muscular endurance, coordination training and recovery indicators of students as the object of research, the methodology for adjusting the training load depending on heart rate, subjective tension, test results and signs of recovery as the subject of research, and their relationship is revealed through the purpose, content, method, control and reflection components of the lesson. As the main scientific result, an individualization algorithm was developed, consisting of initial diagnostics, weekly monitoring, determination of load zones, control of risk signs, correction of the microcycle and final reflexive assessment; this model allows organizing physical education classes not as a one-time load, but as a system that forms the student's movement culture, health literacy, safety competence and independent exercise habits. The scientific novelty of the article is determined by assessing the physical fitness of students not by the same standards, but by multi-criteria monitoring reflecting the dynamics of the functional state and building a training trajectory corresponding to this assessment, and this innovation serves to modernize the content in the field of physical culture, humanize the assessment, and increase the health-improving effect of training. As a practical recommendation, it is advisable to enrich the course development in departments with competency indicators, determine the student's readiness through introductory diagnostics, differentiate the load, include safety protocols in the lesson plan, give short, clear and achievable tasks for independent training, and include final reflection in the assessment system. In further studies, it is necessary to verify the effectiveness of the proposed model through experimental work, conduct a statistical analysis of the differences between the control and experimental groups, determine the dynamics of student motivation and functional indicators across different faculties, as well as deepen the mechanisms for adaptation by sport, gender, level of preparation, and health status. The general conclusion is that the future of physical education is not in prescribing more exercises, but in explaining the meaning of each exercise, ensuring its safety, showing personal progress, and forming a culture of movement that will be transferred to the student's entire life. Individualization, based on functional monitoring, fairly includes both strong and weakly prepared students in the pedagogical process, that is, it turns the lesson from a uniform order into a scientifically controlled process. At the same time, the proposed model should be viewed not as an absolute and final scheme, but as an open pedagogical constructor: each department can adapt it to its own sports base, student contingent, curriculum, and regional conditions. It is important that the main principles of the model — scientificity, safety, a differentiated approach, motivation, reflection, and the formation of a stable movement habit — be preserved. To enhance the practical value of the article, it is advisable to organize a small experimental platform at the department level in the future, test the model elements in selected groups during one semester, compare functional and motivational indicators before and after the lesson, conduct content analysis of teacher and student opinions, and compare the results across faculties. Such an approach does not leave the article at the level of theoretical reasoning, but turns it into a ready-made platform for the next scientific article, dissertation research, or scientific and methodological project of the department. At the stage of preparation for scientific publication, it is recommended to shorten or expand the text of the article in accordance with the specific journal requirements, align the list of references with the journal style, enrich it with tables and diagrams if there is an empirical test, and strengthen the level of substantiation of the theoretical model as a conceptual article if there is none. The most optimal way is to support the theoretical model with the results of a small experiment; then the article will become not just a set of ideas, but a full-fledged scientific product combining evidence, methods, and practical recommendations. In conclusion, it should be noted that any modern article in the field of physical culture will be strong only when it combines three layers: a social need related to national education

and sports policy, a theoretical foundation based on international scientific recommendations, and a methodological mechanism that can be implemented in real classroom conditions. This article tried to preserve these three; therefore, even if the text is edited in the subsequent publication process according to the requirements of a particular journal, its main scientific direction and practical value will be preserved. In the practice of the department, such articles can serve not only as a publication unit, but also as a working document for educational and methodological renewal: revising the subject plan, organizing seminars, conducting small projects with students on a healthy lifestyle, and enriching sports classes with scientific observation. This approach strengthens the connection between the scientific article, lesson development and practical training of a physical culture teacher; as a result, theory does not remain on paper, and practice does not turn into a set of random exercises. This provides the most necessary criterion for scientific work in the field of physical culture - the criterion of influencing the quality of the real lesson. It is for this reason that the balance between theoretical rigor and methodological simplicity was maintained and strengthened in the article. Therefore, functional monitoring brings the lesson of physical culture closer not to control, but to conscious management.

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