

OPTIMIZATION OF ON-LINE PHYSICAL EDUCATION BY PERCEIVING THE PEDAGOGICAL-DIDACTIC PRINCIPLES OF STUDENTS AT UKIM

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Abstract

During the development of the teaching process, the way of work, the general and obligatory principles, according to which the teacher is guided in planning, organizing and conducting the teaching, the question arises: Does the application of the pedagogical didactic principles contribute to the realization of optimization of the on-line teaching of physical education at UKIM? The application of the pedagogical didactic principle and the realization of the optimization of the on-line teaching of physical education at UKIM is the problem that was researched in this paper, so that later the results of this research can be applied in practice for more efficient implementation of the given goals and tasks. Therefore, it is important to investigate the relationship between pedagogical and didactic principles and the optimization of the teaching process regarding the on-line teaching of physical education. Variables in the research represent the application of pedagogical didactic principles in on-line teaching and their contribution through the realization of the optimization of the teaching process. The sample consists of 496 students from several faculties of UKIM who realize the teaching of the subject Sport and Health. The quantitative results obtained through the qualitative analysis confirmed the individual hypotheses, as well as the general hypothesis: Maximum possible success in achieving and applying the pedagogical didactic principles will be enabled and contributed by the optimization of the online teaching of physical education at UKIM.

Key words: Pedagogical didactic principles, optimization, on-line teaching, students

Introduction

Optimization of the teaching process is the selection and implementation of such methodological procedures that enable the achievement of the best results with minimal cost of time and work by the teacher and the student.

In order to achieve optimal results, it is necessary to apply the teaching principles, modern teaching forms and methods in a comprehensive way, as well as to take into account the specifics of the group and the students.

The best (optimal) variant is selected based on the criterion of optimality - an indicator for the evaluation and selection of the best solution from the possible solutions. Considering the specific conditions, the teacher should choose the best form of teaching, the best method and the best class structure to optimally realize the objective.

Optimality criteria are not static, given once and for all. They are determined when the work is planned and realized and depend on the conditions (provision of premises, didactic material, the composition of the group). They are determined in order to:

1. Maximum possible success in acquiring knowledge, skills and habits, as well as in forming success.
2. Minimal time spent by the teacher and students, but maximum results
3. Sufficient spending of the time of the teacher and the students for achieving the planned results.
4. Lower cost of funds, compared to the standard, to achieve maximum results.

The closest category of optimization is "increasing efficiency", which can be achieved in different ways: by intensifying the work or increasing the time to successfully solve the set tasks.

Activities necessary for the realization of the optimal variant of the class:

- Complex setting of educational, training and development tasks;

- Concretization of the teaching tasks according to the real possibilities of the student and conditions for teaching
- Separation of the important contents and striving of the students to adopt them;
- Selection of optimal class structure;
- Selection of the most rational methods and teaching aids.
- Stimulating the student, controlling the class and correcting the plan and the organization (if necessary)
- Selection of the most rational synthesis of frontal, group and individual forms of work (differentiation of teaching)
- Selection of the most rational time variants (using time-saving procedures during school hours and homework)
- Creating favorable conditions for teaching
- Checking whether the achieved results are in line with the real possibilities of the student and the norms for spending time of the professor and the students.

During the teaching process itself, two basic optimization procedures are applied: rational merging of the activities of the professor and the student (learning optimization) and current control, correction of the course of teaching. With the current management and control of the teaching process, the feedback is realized on the basis of which the professor reacts in the newly created situation.

The concept of optimization grew on the basis of theories for managing more complex phenomena and processes. The most important elements for the management function are planning, organizing, stimulating, controlling, analyzing, but not all of them can be applied to the concept of optimization.

Didactic principles (from lat. Principium= leadership with ideas, basic rules of conduct, principle, basis) are defined as basic, general and mandatory principles according to which the teacher is guided in planning, organizing, conducting and evaluating the teaching. They cover the interpretation of teaching and its contents, the work of the teacher and the organizational forms of upbringing and education.

Principles are basic criteria for theoretical observation or practical activity. It is based on requirements that organize and direct the educational work in individual educational areas.

The principles as general requirements and mandatory norms of teaching, apply to all subjects and all participants in the teaching process. In addition to the principles, there are rules for consistent application of the didactic principles, through which the activities are determined so that the teaching tasks can be realized.

The principle of obviousness and abstractness implies a complete perception of the objects of study with the help of the senses, in order to acquire a certain fund, facts on the basis of which clear and precise representations of the object of study will be formed. The obviousness in the teaching is achieved when the students are enabled to sensibly receive the objects and phenomena that are processed in the teaching process. It signifies a concrete experience of objects and phenomena.

The principle of systematicity and gradualism is understood as a causal connection of the elements in a single and harmonious whole. The more complex the activity, the more there is a demand for it to be structured and systematically based. In applying the principle of systematicity and gradualism, it must be borne in mind that the logical structure of science, on which the material of a subject is based, can not completely coincide with the structure of the teaching contents, because the task of teaching is for students to fully understand master the scientific structure.

Principle of individualization, differentiation and integration, бара наставата да се диференцира до тој степен за да се задоволат разликите помеѓу учениците и нивниот психофизички развој и можности, интереси, темпото на работата, искуството и другите особини. This should help students make the most of their potential. This principle achieves significant individualization of teaching, greater activity and freedom of the student, his progress according to individual abilities, but significantly reduces the role of the teacher and the socialization of the student. Individualization can be achieved through different forms of work. It can be achieved through group work, pair work and individual work. With such teaching, the student's abilities are completely perceived, the level of knowledge is determined and the gaps are perceived.

The principle of conscious activity requires students to master the teaching tasks with conscious effort. In didactics this principle is called: principle of independence, awareness, self-activity, self-work. The goal is for students to understand learning as an internal need, not as an external imposed obligation. In that case they will responsibly overcome the ugliness without being warned by the teacher. Human work is very

different from animal work because it is a conscious activity. Each individual can inherit great talent, but talent alone will not be enough if it is not further developed by the individual's own activity. Four areas of conscious activity are important for human development: sensory, practical, expressive and mental. The ability to observe is not conditioned by sensory activity, practical work by motor activity, expression by linguistic activity, thought by thinking activity. The knowledge gained through conscious activity lasts longer and is deeper.

Principle of rationalization and economy in all areas of human work the maximum effect is achieved to minimize the cost of time, energy and resources. This means that the teaching strives to spend less time in the processing of teaching contents, and the success to be complete. When it is said that the cost of energy and time should be minimal, it does not mean that the teaching time should be saved at any cost, but that depending on the nature of the material and the level of previous student education, to plan and spend the optimal necessary time. When it is said that the cost of energy and time should be minimal, it does not mean that the teaching time should be saved at any cost, but that depending on the nature of the material and the level of previous student education, to plan and spend the optimal necessary time. There is no rationalization and economy in teaching without good organization of the class. If the stages of the lesson are realized according to the real state of the student's knowledge and the nature of the material that is processed, maximum success will be achieved with a minimum cost of time and effort.

Principle of accessibility and activity according to the age of the student It is pointed out that the choice and the way of processing the contents should be measured (accessible) to the adult possibilities of the students for whom they are intended. In the literature, this principle is variously called: adaptability, adequacy, accessibility. The principle of accessibility must respect:

- New knowledge must be based on previously acquired and assimilated knowledge.
- The knowledge system that students need to master must contribute to their intellectual development, to lead to a new quality.
- Students should be clear that learning is their inner need, that they need it for later life. Then, they will approach the curriculum more responsibly.

Principle of science in teaching, means that the entire teaching is based on scientifically verified contents, forms and methods. The teaching topics that are given that the teacher should work on, should be interpreted scientifically. It uses a textbook that must be scientifically based, with different didactic material and teaching aids, in order to acquire scientifically verified knowledge.

Materials & methods

This paper researched the use and impact of pedagogical didactic principles in the realization of the optimization of on-line teaching of physical and health education at the faculties of UKIM. This shows the basic problem of the research, which is defined as follows:

Does the application of the pedagogical didactic principles contribute to the realization of optimization of the on-line teaching of physical education at UKIM?

The extent to which the application of pedagogical-didactic principles influences the realization of the optimization of on-line teaching in physical education at UKIM, is the problem that was researched in this paper, so that later the results of this research can be applied in practice for more efficient implementation of the given goals.

The research was conducted in several faculties of UKIM through the subject Sport and Health. There are conditions for such research, because at UKIM teaching is conducted at more than 15 faculties. The results of this research will certainly find application and will serve as an indicator for determining the optimization of on-line teaching from the aspect of pedagogical didactic principles, as well as the impact of those principles on the optimization of on-line teaching in physical education at UKIM.

The subject of the research is to determine whether the pedagogical and didactic principles have an impact on the optimization of on-line teaching in physical education at UKIM, whether their use has a role in the realization of optimization and development of on-line teaching in physical education.

From the basic problem in the research arises the hypothetical framework, ie the general hypothesis and the special hypotheses.

The general hypothesis is defined as follows: If we have the maximum possible success in achieving the pedagogical-didactic principles, then they will contribute and enable the optimization of the teaching of physical education at UKIM.

Specific hypotheses are defined to test and prove the general hypothesis. 3 separate hypotheses have been identified.

H1- if we have the use of the principles of obviousness and abstractness, connection, activity and permanence, then we will have the realization of optimization with the complex connection of educational, training and development tasks, the concretization of teaching tasks, the most rational choice of methods and teaching aids according to real possibilities of the student and the teaching conditions.

H2- if we have the use of the principle of activity and systematicity, it will contribute to the selection of the optimal structure and the most rational variants of the class, as well as optimization in achieving the results in terms of spending time and resources.

H3- if we have the use of the principle of availability and individualization, then optimization will be initiated in simulating the student and adopting the important contents, controlling the class and correcting the plan and organization.

Variables in the research are the realization and application of pedagogical didactic principles for the realization of the optimization of the on-line teaching of physical education at UKIM.

The realization and application of the pedagogical didactic principles was an independent variable, and the optimization of the on-line teaching of physical education at UKIM was a dependent variable.

"On line" questionnaires (google forms) are used as a method for data collection. During this procedure, the respondents (students) are asked questions about the goals and objectives of the research.

Data analysis includes conception and planning, data evaluation, analysis technique, hypothesis verification. In the conducted research, the sample consisted of 496 students from several faculties of UKIM.

The research data were collected based on two survey questionnaires that were compiled by the authors of the paper. The questions are of the closed type. Seven questions were asked in Questionnaire 1, which refer to the independent variable, the realization and application of the pedagogical didactic principles. Questionnaire 2 also consists of seven questions related to the dependent variable, the optimization of on-line physical education at UKIM. There are three alternatives to each question: "yes", "no" and "partial".

The questions are simple and do not take time to explain. The way of answering is just by pressing the marked place on the answer they decided on, and at the end of the answers they close the questionnaire with the position "Submit", so that the answering procedure does not take much time. Attention was paid to the logical and psychological order of the questions, so that the respondents experienced the content for which they had to answer.

The data obtained from the survey were computer-processed using an appropriate program. In the data processing process, the methods of data analysis and synthesis are used.

Results & discussion

Based on the qualitative analysis of the obtained quantitative results, an interpretation was made, ie emphasis was placed on what most influences the realization of the optimization of physical education teaching, all in order to confirm or reject the given hypotheses.

Special Hypothesis 1: if we have the use of the principles of obviousness and abstractness, connection, activity and permanence, then we will have the realization of optimization with the complex connection of educational, training and development tasks, the concretization of teaching tasks, the most rational choice of methods and teaching aids according to real possibilities of the student and the teaching conditions.

Through questions 1, 2, 3 and 4 of Questionnaire 1, it was researched whether we have the use of the principles of obviousness and abstractness, connection, activity and permanence in on-line teaching. According to the results of the quantitative analysis, convincingly most of the students answered that they perform the on-line teaching, as it is represented and presented to them, they perform it with understanding and comprehension.

In this hypothesis, the contribution to the realization of the optimization of on-line teaching in physical education is taken from the aspect of the answers to questions 1 and 6 of Questionnaire 2, where the quantitative analysis shows that most respondents answered in the affirmative, which means that they believe that they understand the on-line teaching in its content and form, they can perform it, and the methods of the lesson are age-appropriate. The independent variable in this hypothesis is 2.68, while the dependent variable is 2.69. If the principles of obviousness and abstractness, connection, activity and permanence are applied in teaching and performed according to them, it leads to optimization with the complex connection of educational and developmental tasks in the concretization of teaching tasks, the most rational choice of

methods and teaching aids, according to the real possibilities of the student and the teaching conditions. The obtained quantitative results **confirm the individual hypothesis 1**.

Special Hypothesis 2: if we have the use of the principle of activity and systematicity, it will contribute to the selection of the optimal structure and the most rational variants of the class, as well as optimization in achieving the results in terms of spending time and resources.

Through questions 5 and 6 of Questionnaire 1, it was researched whether we have use of the principle of activity and systematicity. According to the results of the quantitative analysis, the vast majority of students answered that online teaching is active enough, uniting their physical and mental health, and the exercises are performed from easier to harder and have a connection of the elements. The value of the independent variable is 2.55.

In this hypothesis, the realization of the optimization of on-line teaching is taken from the aspect of the answers to questions 2, 5 and 7 of Questionnaire 2, where the quantitative analysis shows that most students answered in the affirmative, and online teaching should be applied in regular teaching, with systematically applied and appropriate methods, content and form, age-appropriate. The dependent variable has a value of 2.44, which indicates that the use of the principle of activity and systematicity, initiates the optimal structure and the most rational variants of the class, as well as optimization in achieving results in terms of time and resources. According to the analysis it can be said that the **special hypothesis 2 is confirmed**.

Special Hypothesis 3: if we have the use of the principle of availability and individualization, then optimization will be initiated in simulating the student and adopting the important contents, controlling the class and correcting the plan and organization.

Through question 7 of Questionnaire 1, it was researched whether we have use of the principle of availability and individualization. According to the results of the quantitative analysis, the independent variable with a value of 2.38 shows that most of the students answered that online teaching is available to everyone (each student). In this hypothesis, the dependent variable is presented through the benefit of on-line teaching and complete perception of the presentation from on-line teaching, and is taken from the aspect of the answers to questions 3 and 4 of Questionnaire 2, where the quantitative analysis shows that half of the respondents answered "yes" and "partially", which means that it initiates optimization in simulating the student and the adoption of important contents, control of the class and correction of the plan and organization. Its value is 2.53. According to the analysis, the **special hypothesis 3 can be confirmed**, ie the use of the principle of availability and individualization.

All of the above **confirms the general hypothesis**, namely: *If we have the maximum possible success in achieving the pedagogical and didactic principles, then they will contribute and enable the optimization of on-line physical education at UKIM.*

Optimization of the teaching process is the selection and implementation of such methodological procedures that enable the achievement of the best results with minimal cost of time and work by the teacher and the student. In order to achieve optimal results, it is necessary to apply the teaching principles, modern teaching forms and methods, as well as to take into account the specifics of the groups and students. The more the pedagogical principles are applied, the more it will contribute to the realization of the optimization of the on-line teaching in physical education and the teaching process in general.

Conclusions

Research has been conducted in order to prove the assumption that the application of pedagogical didactic principles will contribute to the realization of the optimization of on-line teaching in physical education. The main factors for the realization of the optimization of teaching are the pedagogical didactic principles, ie their realization, application and implementation.

The results of the research conducted on 496 students from 15 faculties of UKIM who realize the teaching of the subject Sport and Health (teaching of physical education), show that most of them think that they can perform on-line teaching as represented and presented to them, with understanding and comprehension, and the content, form and methods of the lesson are age-appropriate.

The obtained results indicate that in most of the students in which the examination was conducted, on-line teaching should be applied in regular teaching because it is active enough, uniting their physical and mental health, and the exercises are performed from easier to more difficult, ie there is a connection of the elements.

The students who were included in the research believe that they have a full perception of the presentation from the online teaching, and by being available to everyone, they have a great benefit from it.

Research has shown that optimization requires professors to abandon the stereotypical, intuitive, associative approach to the teaching process and to choose the optimal variants for its realization based on scientific settings.

On-line physical education classes need to optimize the methodology for the most favorable variant for the organization of the teaching process that will provide high quality results with minimal time consumption of both the professor and the student.

The optimal organization should provide on-line lessons to realize the educational, upbringing and general development tasks of the student. Therefore, in the contents, the important thing stands out, which must be adopted by all students, choosing the most suitable methods, means and forms.

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