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POSSIBILITIES OF THE "CONFUSED LOGICAL CHAIN" METHOD IN ASSESSING STUDENTS' KNOWLEDGE

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Abstract
This article discusses the use of the "confused logical chain" method for assessing students' level of knowledge during practical classes in the Dynamics section of the course Theoretical Mechanics. The study examines the effectiveness of this method in evaluating students' understanding of theoretical concepts, logical thinking abilities, and problem-solving skills in practical lessons.

Keywords: theoretical mechanics, dynamics, force, mass, law of motion, equation, differential equation, initial conditions, integration constants, first problem, second fundamental problem.

Nowadays, the process of educating young people is continuously developing and improving. In particular, the digitalization of the educational process has created great convenience for both students and professors. The HEMIS system, which is widely used by students and teaching staff in the educational process, has already demonstrated its comprehensive positive aspects within a short period of time. Therefore, it is now necessary to adapt both the teaching system of all subjects and the student assessment system to this platform. In this regard, the application of the "confused logical chain" method, considered one of the

interactive teaching methods, in practical classes of Theoretical Mechanics is of particular relevance.

Let us consider the application of this method in the process of conducting practical lessons on the topic "Integration of the Differential Equation of Motion of a Material Point" in the Dynamics section of the Theoretical Mechanics course taught at technical higher educational institutions. First of all, materials selected from a question bank consisting of theoretical information related to the topic are distributed to students in order to determine their level of preparedness on the subject according to the "confused logical chain" method. The instructor conducting the practical lesson distributes tables corresponding to the number of students in the group. After carefully studying the given table, the students write the sequence numbers of the correct answers corresponding to each question presented on the left side. Then, the instructor collects all the answers from the students, checks them, and announces the results. Below is a table corresponding to the topic mentioned above.

Determine the correspondence:

1	**Write the analytical form of the differential equation of motion of a material point.**	**1**	$m\frac{d^2\vec{r}}{dt^2} = \vec{F} + \vec{N}$
2	**What are boundary conditions and initial conditions used for?**	**2**	**By taking the second derivative of the given law of motion and multiplying it by the mass, the components of the force are determined; based on these components, the magnitude and direction of the force are found.**
3	**Define the second fundamental problem of Dynamics.**	**3**	$m\vec{a} = \vec{F}$

4	**Write the vector form of the differential equation of motion of a constrained material point.**	**4**	$m\ddot{x} = \sum F_{kx}\,, m\ddot{y} = \sum F_{ky}\ ,\quad m\ddot{z} = \sum F_{kz}$
5	**Write the fundamental equation of Dynamics.**	**5**	**When the force acting on a material point and its mass are given, it is necessary to determine the law of motion.**
6	**How is the first problem of Dynamics solved?**	**6**	**Boundary conditions and initial conditions are required to determine the constants of integration.**

Correct answers: (4, 6, 5, 1, 3, 2).

At the next stage, we proceed to the practical problem-solving part of the "confused logical chain" method. In this case, the number of distributed questions also consists of six items. However, relatively simple practical problems are recommended to students. As a result, the knowledge acquired by students on the topic can be assessed quickly, easily, and objectively. Below is an example taken from the question bank developed for the above-mentioned topic.

Determine the correspondence:

1	**A material point with mass (m = 1 ,kg) moves rectilinearly in a plane. If the acceleration of the material point is described by the law $a_x = 12t^2$ m determine the general**	**1**	**10 N**
2	**A material point with mass m=2 kg performs rectilinear translational motion according to the law $x=5t^2$ m Determine the magnitude of the force acting on the point**	**2**	$\frac{d^2x}{dt^2} = 5t^3 - fg$

3	**A material point with mass m=2 kg moves rectilinearly in a plane. If the acceleration of the material point is described by the law $a_x = 24t^2$ m and its initial velocity is equal to zero, determine the velocity of the point at t = 1s ,**	**3**	***48 m/s, 72 m/s***
4	**A material point with mass m=1 kg moves in a plane according to the laws $x=4t^2$ m, $y=3t^2$ m Determine the magnitude of the force acting on the point.**	**4**	**$X=8t^4+ t C_1+C_2$**
5	**A material point moves in a plane according to the laws $x=24t^2$ m, $y=36t^2$ m Determine the projections of the velocity on the coordinate axes at t=1s**	**5**	**8 m/s**
6	**A material point with mass m=1 moves rectilinearly along the (x)-axis under the action of a pulling force $F=5t^3$ N and a friction force. If the coefficient of friction is equal to (f), formulate the differential equation of motion of the material point.**	**6**	**20 N**

In the next stage, students are offered more complex problems requiring deeper reasoning. The professor analyzes the obtained results and draws a final conclusion by forming current and midterm grades. The student, in turn, gains an understanding of their level of knowledge in the subject, its section, and the topic, and develops a plan for further improvement.

Thus, the application of the “confused logical chain” method enables students to develop skills such as organizing learned topics, breaking them into structural components, comparing them with other topic elements, and understanding new

information related to the subject being studied. The systematic and regular use of this method in lectures and practical classes ensures the structured acquisition of subject material, the ability to classify and differentiate learned knowledge, and improves overall comprehension. As a result, students' level of knowledge increases significantly. It also provides instructors with an efficient and objective way to quickly assess students' knowledge levels and successfully conduct midterm and final evaluations.

When planning the use of the "confused logical chain" method in teaching practice, the following aspects should be considered:

– It is necessary to prepare an extensive question bank based on topics within the subject.

– The question bank should be developed separately for each topic, chapter, and section of the course.

– A separate set of logical and relatively simple problem-solving tasks should also be prepared.

– To assess students' level of mastery, tables consisting of 5–7 questions should be prepared in variants equal to at least the number of students in the group.

– For midterm assessment, the instructor should prepare 10–12 question-based table variants.

– For final assessment, it is recommended to prepare 15–25 question-based tables.

– Sample question banks and solution procedures should be regularly published on the department's website.

– The question bank and problem sets should be updated every academic year.

In conclusion, the "confused logical chain" method is considered one of the modern and effective approaches for assessing students' knowledge. Based on recent pedagogical experience at the department, this method has proven to be highly effective. In particular, it stands out from other assessment methods by providing high efficiency in evaluating students' knowledge for a single topic, a chapter of the subject, and during midterm assessments.

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