THE ROLE OF PRACTICAL CLASSES AND METHODS TO IMPLEMENT THEM WHEN PROMOTING MATHEMATICAL PROBLEMS IN A TECHNICAL UNIVERSITY

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ABSTRACT

Analysis of the leading pedagogical experience shows that without practical classes, issues of deepening scientific and theoretical knowledge and mastery of certain working methods of a discipline curriculum cannot be solved. In most cases, the methodology of solving applied tasks using the theory of ordinary differential equations is reduced to the detailed parsing task conditions. Particularly, it should be noted that when forming the skills of solving applied tasks in the process of studying differential equations, attention should be directed to the knowledge needed to build a mathematical model in the form of differential equation, given adequate condition challenging the reality of the situation. Mathematical modeling methods are used in the teaching of mathematics in two forms: models which do not fit into any of the known schemes and models of known species, which applies mainly to consolidate the material or to solve problems with professional content. Mathematical modeling typically goes through several stages of formalization (wording) of methods of the mathematical interpretation of obtained solution. Each stage formed by certain elements of the mathematical culture. With the formalization of the associated skills: identify the source of the concept of mathematical equivalents; use a variety of mathematical languages for describing models; identify parameters, variables, establish performance criteria, as well as attitudes and skills assessment. Experience shows that the practical tasks with simultaneous strengthening attention to creative thinking of the students mathematical the situation lead to conscious and lasting learning of theoretical material, helping you see the relationship of Mathematics with other sciences, promotes the development of professional interest and skills in future engineering activity.

Keywords: Method, practice, differential equations, mathematical, model, engineering.

To strengthen the professional orientation of study mathematical disciplines in technical universities necessary to increase the proportion of professional orientation tasks. The analysis of the today used curricula and textbooks in higher technical educational institution shows that concerning a number of topics this condition is fulfilled. In particular, it uses concepts and methods of classical analysis, vector algebra, integration, and differential equations with examples of strength of materials, thermodynamics, theoretical mechanics, which provides a basis for the development of imagination and thinking, shows that the differential equations can become a means of studying the natural phenomena using mathematical models, i.e. have a practical orientation. However, this is not enough for the broader mathematization, so it should more intensively use mathematical modeling using both inductive and deductive methods.

From a logical point of view model-real or mentally represented system that supersedes and displaying in the cognitive processes of other system-the original-is in relation similarity (similar), the study of models allows to get information about the original. Describing the essence of mathematical modeling, A.N. Tikhonov and D.P. Kostomarov note [5] that the mathematical model is based on simplification, idealization, and approximate reflection

object. On the basis of this allegation, and based on research we note the most important principles of modeling. It is the use of all relevant information stability (stability of the simulated object); extrapolaribility (some commonality).

L.G. Peterson [3] considers the following features: graphic simulation, heuristic, integrative or synthesizing. Reflected in the mathematics course bearing graphic, heuristic, integrative or synthesizing burden contributes to the solution of a number of key pedagogical objectives, namely improving the professional orientation; the formation elements of mathematical culture and general culture; assimilation of inter-subject links, etc. Mathematical modeling method used in the teaching of mathematics in two forms: models which do not fit into any of the known schemes and models of known species, which applies mainly to consolidate the material or to solve problems with professional content.

Mathematical modeling typically goes through several stages: formalization (wording), its methods of the mathematical interpretation of the obtained solution. Each stage formed by certain elements of the mathematical culture. With the formalization of the associated skills: identify the source of the concept of mathematical equivalents; use a variety of mathematical languages for describing models; identify parameters, variables, establish performance criteria, as well as attitudes and skills assessment. Interpreting phase fosters the ability to move from general to private claims, practically considered the findings; measure error of interpretation.

Of course, that all stages are carried out addressing the simulation of specially selected tasks. It is the solution of specially selected tasks allows you to disclose to students link of received knowledge with surrounding reality and change their attitude to discipline and teaching in general, makes training activities meaningful and productive. Leading role in professional orientation belongs to activities that in content, form and conditions of implementation approaches the activities of a research-engineer, so one of the main objectives of teaching mathematics in our firm belief, confirmed by our research and experience engaging students for teaching and research, starting with the junior courses. Analysis of numerous literary sources, textbooks, monographs and other sources, advanced pedagogical experience shows that without practical classes, issues of deepen scientific and theoretical knowledge and mastery of certain working methods of a discipline curriculum cannot be solved.

This statement is absolutely true, because practical training deepens and supports the knowledge gained in the Lecture course, communication theory and practice and applications to other sciences, acquired certain abilities and skills on the conscious application of theoretical material in solving practical problems.

Therefore, the activity performs multiple functions-cognitive, control, corrective, and when we're talking about math, and teaching the computing skills, hence the variety of practical exercises. It could be all sorts of tests that contain both theoretical and practical issues; individual tasks for independent work; control or computation-graphic works. When the prerequisite is learning assistance to the teacher, checking homework and analysis, detailed review of ways of solving logic reasoning and evaluation, with the educator necessarily focuses on best practices to address the challenges in making the most original and ingenious solutions on board to help you remember.

The first practical lesson on "differential equations" begins with an examination of tasks, emphasizing that many of the questions of physics, chemistry, economics, technology and

other areas are to find a function *t* equations in which, apart from this function and arguments on which it depends are also its derivatives up to some order, inclusive, then at the specific examples show that task. Leading to differential equations are diverse and offer an opportunity to address many of the issues of general technical and special disciplines, in particular, resistance of materials, physics, hydraulics, theoretical mechanics. Tasks are dealt with fully detailed consideration of different types of differential equations and parsing concepts such as: general decision, private solution, special decision overall, integral private integral with a clear focus on the substance of the concept of "solution". This is especially important. The first practice session on "differential equations" gave students the opportunity to see how differential equation is born, the concepts about themes and taught to analyze concepts: "decision", "is a general integral", "solution", etc.

In this lesson you can give students the assignment to prepare a statement on the theme "application of differential equations for solving problems of natural sciences". Students must independently choose and decide with detailed justification tasks in physics, chemistry, biology, ecology, choosing the subject at their discretion, but also an indispensable using differential equations. Such work is entirely practical, because allows the student to find solutions that delve into literature, consult with other students and finally find it. That in his view would be more interesting. Examining solutions to differential equations, students solve those equations that were proposed and obtained during the first lesson.

Solving tasks independently, student learn to create differential equations to conditional challenges and develops the skill to solve differential equations. It should be noted that there are different points of view of researchers who must teach the student to solve applied tasks. Some [1] believe that training address applications mathematical methods is a challenge courses, and mathematics should confine themselves to the simplest specific examples illustrating the application of mathematical concepts to explore real-world phenomena. Other authors of the book [2] adhere to a more radical position, namely, that the formulation of the primary skills of applied mathematical research should become an essential element in teaching mathematics. We agree with this view, because the insulation system of mathematics activities future specialist, poor usage in major courses leads to weak mathematical training of students. To avoid this you must put at the forefront the formation of generalized solution techniques training tasks.

Here we must agree with D. Poya conjecture [4], which proposes a scheme consisting of several stages of understanding the problem statement, planning decisions, the implementation of the decision, a look back (the study of the resulting decision). The essence of the positivity of this scheme is that there are no individual actions, and the whole system, because understanding the task includes its analysis, which is already complicated activities and planning decision is accompanied by a search for a solution, which is composed of many components. All tasks for solving differential equations is searched one function of the independent variable that is closely connected with the development of functional thinking, which is one of the forms of technical thinking and should take into account two aspects: of all the variables listed in the task, you must select x and y, which are connected among themselves functional dependence; one of them (x) will serve as an argument, and the other (y) function of the argument; because the solution of the problem boils down to the establishment of a functional dependency between variables x and y, then the differential equation must be prepared for the unknown function.

Students' attention should be drawn to the need to take into account, to which the task applies to phenomena and patterns of these phenomena, i.e. allocate the common law, under which gets a studied phenomenon and more: when drafting the differential equation for the process almost always have to make some assumptions that simplify the task to bring a studied phenomenon known under the law. Namely, that the target uneven process is flowing evenly in a short period of time. Compilation of a differential equation is the definition of the mathematical relationship between variables and their increments, with the increment immediately replaced the relevant differentials.

In most cases, the methodology of solving applied tasks using the theory of ordinary differential equations is reduced to the detailed parsing task conditions drafting drawing, drafting of process equation, defining the general and private solutions to this equation, the definition of auxiliary parameters (if needed), the conclusion of the general act for the process, analysis and response source verification task (sometimes some of these recommendations may be absent). Particularly, it should be noted that when forming the skills of solving applied tasks in the process of studying differential equations, attention should be directed to the knowledge needed to build a mathematical model in the form of differential equation, given adequate prerequisite tasks a real-life situation, i.e. the ability to translate with special physical, chemical, technical language into mathematical language theory of differential equations, as well as the ability to translate results obtained in the language of mathematics in a given situation. Students also need to learn that the generic method compilation of differential equation, suitable in all cases, no, there are just some general guidance of the heuristic nature, namely that, when formulating the differential equations (depending on conditions) known laws of physics, chemistry, mechanics, and other sciences must be used, which is the value of the tasks of this type. This can be a task model, which are the equations in derivatives, or tasks when the model represents the differential equation, which defines the characteristics of building differential equation. However, to fully exploit the intellectual potential of every student, you must use different job levels in mathematics, which consist of three parts. The first part requires playback definitions, terms, concepts, formulas, methods, outcome; to answer the second part of the job, you must prior conversion; the third part is a creative task, which is based on transferring knowledge in a new situation.

For example, on "differential equations of the first order" may be offered tasks (find specific solutions that meet the specified initial conditions) which requires a mechanical memory and ensures assimilation of factual material. For the second level requested to find a general solution of the differential equations that require first converting the differential equation in the linear equation that includes logical memory, generates a basic skill to use actual knowledge in non-standard situations. Third, as noted above, creative level is characterized by the fact that in addition to the first two levels of job tasks are available on the compilation of differential equations. One task, for example, geometric lines: find curves, possessing the property that piece that the tangent at any point in the curve cuts the axis of abscissas square equals 0*y* touch points; and the other is physical: in circuit with inductance occurs in the transition process. Inductance L and the resistance R is constant. Voltage U is set as a function of time t: u = f (t), the starting current is reset. Find the dependence of current i from time t., in particular, consider the case where U = Uo = const.

The solution presented challenges requires, firstly, reliance on knowledge from other areas of science, secondly, training in the preparation of differential equations that requires effort students necessarily attract previously learned material and not just of mathematics, and thus

stimulates creativity. Thus, experience shows that the practical tasks with simultaneous strengthening attention to creative thinking of the students calculation of the situation lead to conscious and lasting learning of theoretical material, helping you see the relationship of mathematics with other sciences, promote the development of professional interest and skills in future engineering activity.

REFERENCES

1. Кудрявцев Л.Д. Современная математика и ее преподование. –М.:Наука, 1980.-143с.
2. Пак В.В. О непрерывной математикческой подготовке будущих инженеров. –В кН.: Проблемы высшей школы. Вып.45, Киев: Вища школа, 1981. – С.33-38.
3. Петерсон Л.Г. Математическое моделирование как методологический принцип построения программ школьного курса // Содержание, методы и формы развивающего обучения математике в школе и вузе. –Орехово-Зуево, 1995. –С.30-33.
4. Пойа Д. Математические открытие. Решение задач: основные понятия, изучение и преподавание. М.:Наука, 1970, -452с.
5. Тихонов А.Н., Костомаров Д.П. Рассказы о прикладной математике. М.: Наука., 1979, 209 с.
6. Turdiyev Sh. R. Pedagogical conditions of successful professionally designed mathematical education in the technical universities. European Journal of Research and Reflection in Educational Sciences (EJRRES).vol.3 No.3, 2015. Pp.1-6.
7. Shadiev R.D., Turdiyev Sh. R. On questions of particularities of teaching mathematics in technical higher education institutions (HEI). Journal of Humanities and Social Sciences № 9–10.Vienna , 2014.pp 141-144.