

Methods of the decision Logicheski problems

Saule Nurkasymovna Nurkasymova^{1,*}, Aray Boshanqyzy Zhanys², Gulyaem Mindugaliyeva Iskakova³, Maqsat Mukhtarovich Rakhimov⁴, Akbota Asylbekovna Meirmanova⁵

¹Doctor of pedagogical sciences, Professor, Corresponding member of Russian Academy of Natural History №6160, honored member of Education and Science of the Russian Academy of Natural History Eurasian National University by name is L. N. Gumilyov, Republic of Kazakhstan, Astana

²PhD, professor, Professor Russian Academy of Natural number 7524, Kokshetau University named after Abay Myrzakmetova Republic of Kazakhstan, Kokshetau

³PhD, Head of Department of Information Systems and Computer Science, Kokshetau University named after Abay Myrzakmetova. The Republic of Kazakhstan, the city of Kokshetau, Auezova Str. 234/5, 020000

⁴Head of Department of Information Systems and Computer Science, Kokshetau University named after Abay Myrzakmetova. The Republic of Kazakhstan, the city of Kokshetau, Auezova Str. 234/5, 020000

⁵Lecturer of the Department "Information Systems and Informatics". Kokshetau University named after Abay Myrzakmetova. The Republic of Kazakhstan, the city of Kokshetau, Auezova Str. 234/5, 020000

Abstract: The fact is that solving physics problems is rather difficult for modern Kazakhstan students. Solving logic problems develops particular qualities that reveal opportunities for the development of student's creative abilities during the learning process. The development of student's creative abilities is an important part of the development of their thinking. All problems can be solved by means of logic. Logic is a set of sciences about the laws and forms of thinking of mathematical-logical laws of calculation and the most general laws of thinking. The logical apparatus allows you to build the right judgment or conclusion and to emphasize a certain concept with its essential features. This paper shows how to apply the basic techniques of solving logic problems while teaching high school students.

Key words: *Physics problems solving; Problems composition techniques; Solving techniques; The development of thinking; The development of students logic*

1. Introduction

Physics is a fundamental basis for the theoretical training of students. Practical application of theoretical knowledge is very important at all stages of education. One of those stages during the study, of the physics course is to solve problems. It is especially important for improving the various forms of student's independent work (Bugaev, 1990).

Finding a solution to the problems is one of the important means to reinforce, repeat and test students' knowledge. Systematic problems solving contributes to the development of students' thinking, preparing them to the creative activity, brings industry, perseverance, dedication. This is a good way to control knowledge, skills and abilities.

One of the most difficult educational challenges is to teach a student how to solve physics problems. Therefore it is very important what kind of teaching methods is used by teachers. Solving of a problem is an indispensable element of the educational process in physics. The ability to solve physics problems is one of the important criteria of learning. But this is one of the most hard-to-gain ability (Tarasov, 1990).

The content of problems solving as a means of training and education is described in terms of its

importance during the learning process. Many scientists believe that the solving of problems in physics is an essential element of academic work: the process serves as a purpose and as a method of learning. It is an inherent part of the process of teaching physics because it allows you to form and enrich the physics concepts, develop student's physics thinking skills and their practical use of knowledge. Defining problems solving as a means of training and education, some authors specify it, through the various teaching categories, as part of the curriculum and the learning process in physics, as the purpose and method of training (William et al., 1993).

In terms of modernization of education, modern educational technology is unthinkable without the extensive use of new information technologies - computer. Of great interest to the modern computer system is a motivational basis for learning activities.

Information computer technologies allow to fully reveal the pedagogical, didactic function of teaching methods, to implement incorporated in their potential; they become the basis of modern education, ensuring the necessary level of quality, variation, differentiation and individualization of education and training (Nurkasymova, 2006).

2. Materials and methods

* Corresponding Author.

Considering the process of solving problems as a teaching method, it is necessary to highlight the purpose of this process in the formation of all the elements of knowledge, skills and abilities. Problems solving involves learning the basic elements of educational activities, its stages and operations as well as provides independent work skill training as a very important element in the formation of personality. On the other hand, problems solving as a method of learning should be inherent in all of the major functions: motivating, informative, educative, developing and controlling.

Definition of problems solving as a learning goal requires a special work of the teacher on the allocation of conditions to ensure a more effective formation of the ability to solve the problems (Heidi et al 2010).

3. The main conditions are

Help students to understand the concept of "problem" as an object of study:

- Retention of its definition and structure;

- Retention of the structure of problem solving process by the students;

- The content of the process of problems solving and its basic operations

- Retention;

- The ways of the material presentation must meet the following requirements;

- To identify the basic concept and theme of the section clearly;

- To formulate the laws that explains the phenomena of nature and the laws

- Which they obey;

- To set a functional dependence between the values using formulas and graphs;

- To generalize the material theoretically: Problems in physics are quite varied according to different criteria relabeling their objectives. They can be classified according to various criteria, reflecting the most common features for many problems with different content.

There are following types of problems according to their solutions:

- Quality problems or issues problems;

- Quantitative;

- Experimental;

- Logic;

- Graphics;

- Problems with the production and technical content;

- Logical problems: The Main Part: The problem solving is an indispensable element of the educational process in physics. This process of retention of physics course by

- a student is related to active methods for promoting the retention of knowledge and the development of students thinking (Geoffrey Hubbard, 1985).

Solving of the problem is an element of the educational process, which is carried out in certain forms organization. The course of theory and

methods of teaching physics considers solving problems during practical exercises only.

Qualitative problems are being solved by using a logical way. The main purpose of logical problems is a formation of concepts in physics. So we can divide logic problems according to their role in the formation of students concepts into the following types: problems require an explanation of the phenomenon, prediction, allocation of common features and significant differences of specific phenomena, the comparison of objects and phenomena in a quantitative terms, the definition of the scope of observation and use of the phenomenon, organization and classification of the concepts, explanation of the nature of use of techniques and work methods on practice.

One of the physics thinking peculiarities is determined by the close relation between physics and experiment and the need to reconcile the theoretical constructs with an experience. In addition, physics thinking is closely associated with high levels of analysis and generalization.

Creative activity involves extensive knowledge, highly developed thinking; mental flexibility and the ability to anticipate the result of the research (Yastrehtseva, 1998).

It is necessary to put students in such situations where they are forced to make assumptions, speculate, to exercise and develop their intuition. It is the best way for the development of creative skills.

There is a considerable experience in the exercise of students in creative problem solving as well as in the performance of creative laboratory works. First of all the task of these laboratory works is to stimulate the students to search for the principle of solutions of theoretical or experimental problem.

Creative activity of the students can be organized not only at the stage of the application of knowledge, but also during the study of a new material and while doing a homework.

Physics as a subject has features that reveal opportunities for the development of creative abilities of students during the learning process (Kumenet, 2000).

It is very effective to use demonstrations as well as teacher's lecture while initialing the students with a new material. In the transition to the study of abstract physical models it is appropriate to use the problem method of presentation using charts, educational models, animations. Finally, the experimental verification of the theoretical results is best to organize in the form of laboratory work and experiments.

Creative tasks may differ in their form: either it is a question or qualitative, quantitative, or experimental problem, or laboratory work. It is extremely necessary to use homework in order to develop student's creative abilities, especially in the form of laboratory studies and observations directly related to educational activities in the classroom as well as writing essays and reports. Creative problems not only develop student's ability to apply knowledge in new conditions, but also create more

favorable conditions for the formation of student's polytechnic education and dialectical-materialist worldview (kumenet, 2000). While solving this kind of problems students not just memorize the description of the phenomena but also explore and find their own way to explain it. They do not memorize the well-known structures, based on existing knowledge, but learn to create a variety of settings. Logical problems are defined as the type of tasks allocated by their solutions. The logical way is a logical form which allows solving the requirements of the problem. The logic as a science defines the logical structures through a form of reasoning. Arguments are coherently set, consistently justified series of thoughts on a topic. Theoretical analysis of concrete situations in logical problems allows identifying the structural elements. The condition of the problem contains a description of the specific situation, the particular phenomena and the statement of the problem identifies an expanded knowledge about the phenomenon.

Logical problems play an important role in the formation of concepts. We can even say they have a leading role (Hani, 2007). This can be achieved thanks to the fact that the student's attention is not distracted by mathematical calculations while solving and is fully focused on identifying significances in the phenomena and processes to establish a bond between them. Logical problems include all the tasks that methodologically are usually called "quality problems".

Let's consider the most important types of logic problems from the point of view of their role in the concepts formation.

There Are Following Types of Logical Problems: Problems in which we have to show examples of manifestations of the studied properties of bodies and phenomena and their use.

Problems that offer to highlight the characteristics of an object or phenomenon only of the given species or genus from the listed attributes of objects or phenomena.

Problems where we need to specify the similarities and important differences between bodies, objects or events.

Problems is that require explaining the phenomenon, the reasons for its occurrence and thus to discover its connection with other phenomena.

Problems where we need to predict the effect on the basis of knowledge of the laws of its course and relations with other phenomena.

Problems where we need to specify the conditions which are necessary for a particular effect or phenomenon.

Problems are requiring explanation the essence of a scientific basis which is used to practice the methods and techniques.

Problems where we need to organize (classify) the objects or phenomena according to certain parameters.

According to the content of the conditions and requirements, there are three types of logical problems: recognition of the physical phenomena on

a particular phenomenon, the explanation of the phenomena and properties of matters, the prediction of phenomenon consequences (Hutorskoj, 2000; Oka et al., 2013).

Solving problems in the recognition of a physical phenomenon in the specific situation is the process of establishing a relationship between the genus and species.

4. Here are examples of logical problems

4.1. Problem 1

That occurs if blow on sheet of paper along his (its) surfaces that occurs.



Fig. 1: As this possible explain (Fig. 1)?

4.2. Problem 2

The fall of the pressure in plumbing is demonstrated on the following model (the rice. 2). Narrow (for increase of friction) pipe A and her (its) branch B, supplied manometric tube, can be closed tap but and b.

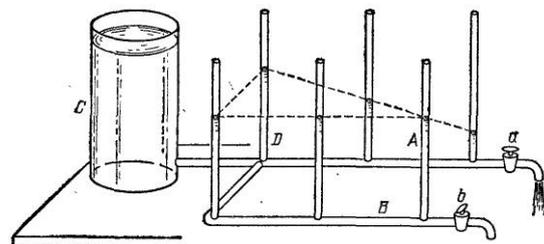


Fig. 2: If fill water in container C and close the taps that we observe what spreads the height to liquids in turban a, b and C and as so much for possible explain?

4.3. Problem 3

For experience we shall make the cylinder from thick, but not thick paper by diameter 5 refer to, length 25-30 refer to on cylinder shall wind the lento, one end which shall attach to straightedge; Sharp motion along horizontal surface of the table gobo rim cylinder complex motion (onward and brachatelyom) (Fig. 3). At top speed cylinder rises upwards and describes the small vertical loop. Explain, why this occurs?

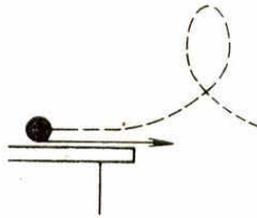


Fig. 3: onward and brachatelyom

4.4. Problem 4

In rainy wind weather, each of us noticed that revealed umbrellas sometimes "выворачиваются inside out" (Fig. 4). Why this occurs?

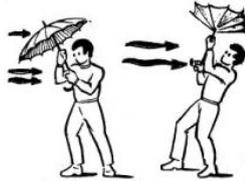


Fig. 4: Umbrellas problem

5. Conclusion

A new teacher's techno logical thinking begins with the master; of this skill: clarity, structural properties; Clarity of u methodological language and the emergence of standards-based methodology. This paper shows an example of logical problems' and some methods for their solution. The model ideas about the teaching materials of educational process were specified by the results of solving logical problems. I here also was designed a new generation of logic puzzles with a wide participation of the teacher. The le\ el of complexity of and content of the problems is changing due to the fact that the teacher's activities aim to build a model of the educational process with predefined quality indicators.

References

- Bugaev. A.1. 1990. Methods of teaching physics in high school, pp: 14,
- Geoffrey Hubbard. 1985. English experience with computers in education: Implications for a policy, education and Computing. 1(2): 91-96.
- Heidi. I. Iverson. Mark JI Lewis and Robert M. Talbot III. 2(108. Building a framework for determining the authenticity of instructional tasks within teacher education programs. Teaching and Teacher Education. 24(2); 290-302.
- Hutorskoj. A.V.. 2000. The development of gifted students: Methods o f Productive Teaching, pp: 66.
- kumenet/kij. S.F... 2000. fbeory and methods of teaching physics in high school. Private matters, pp: 27.
- Lvans, .I.ST.R.T.. 1972. On the problems of interpreting reasoning data: Logical and psychological approaches. Cognition. I (4): 373-384.
- Marco De Hani. 2007. Using logical relevance for question answering. Journal of Applied Logic. 5(1): 92-103.
- Nurkasymova S. N., Zhanys A. B., Tuyakbaeva S. B. Resistance measurement by applying it Wheatstone bridge. WALIA journal 32(1): 10-12, 2016 Available online at www.Waliaj.com ISSN 1026-3861 © 2015 WALIA.
- Nurkasymova SN The use of information technology in the teaching of physics - 2006.
- Oka lor. P.N.. K. Anoruo. A.O. Bonire and F.N.. Maduagwu. 2008. The Role of Low-Protein and Cassava-Cyanide Intake in the A etiology of Tropical Pancreatitis. Global Journal of Pharmacology. 2(1): 06-10.
- Prajapati Hetal Ritesh. Brahmkshatriya Pathik Subhushchandra. Vaidva Hitesh Bharaththai and V. Thakkar Dinesh. 2008. Avian Influenza (Bird Flu) in Humans: Recent Scenario, Global Journal of Pharmacology. 2(1): 01-05.
- S.N. Nurkasymova , A. B. Zhanys , G. M. Iskakova , S.B. Tuyakbaeva. Determining factor fluid viscosity through information technology. WALIA journal 32(1): 10-12, 2016 Available online at www.Waliaj.com ISSN 1026-3861 © 2015 WALIA
- Tarasov. I.V. 1990. Modem physics in high school, pp: 27.
- William. F. Tunmer Andrew R. Nesdale and Chris Pratt. 19X3. The development of young children's awareness of logical inconsistencies. Journal of Fxperimental Child Psychology. 36(1): 97.
- Yastrehtseva L.N.. 199S. The computer in the school. 3: 98.