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READERS ARE "CONDUCTING EXPERIMENTS, MEASURING PHYSICAL MAGNITUDES, AND DRAWING CONCLUSIONS IMPROVING THE METHODOLOGY FOR THE FORMATION OF" COMPETENCE"

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Abstract
The article analyzes the scientific and methodological foundations of the formation of the competence "conducting experiments, measuring physical magnitudes and drawing conclusions" in the students of the academic Lyceum of Internal Affairs on the basis of the importance of "mobile software applications"in the formation of this competence.

Keywords: conducting experiments, measuring physical magnitudes, drawing conclusions, competence, laboratory training, physical measuring instruments, demonstrative experiments.

Introduction

Currently, by consistently implementing competency approaches to educational processes, the preparation of students as full-fledged adult individuals is gaining relevance. Academic lyceums of the Ministry of Internal Affairs on the basis of DTS for the educational direction of social and humanitarian Sciences, the curriculum on the subject "Physics", developed in 2023, also provides for the formation of general competencies in physical science in students, the implementation of which aims to prepare students with competencies.

It can be said from the DTS, which is being practiced in our country, that we can systematize the types of general competencies related to the physical science of students as follows:

- Observation, understanding and explanation of physical processes and phenomena competence;
- Conducting experiments, measuring physical magnitudes and drawing conclusions competence;
- Ability to use physical knowledge and tools in practice competence.

This article will talk about the methodological foundations of the formation of student competence for conducting experiments, measuring physical magnitudes and drawing conclusions. It is known that physics is an experimental or experimental science. Through experience, the laws are checked, while the laws that apply to physical realism are discovered. The difference between the experimental method and the observation method is that in it the object is actively affected, a suicidal environment is formed in accordance with the purpose. Based on this very property of science, students have a wide range of possibilities for forming the competence of conducting physical experiments.

Experience is the process of emotionally empirical knowledge of reality in a practical way, consisting of the unity of learning, competence and knowledge. Abu Rayhan Beruniy has advocated explaining observation by relating it to experience. He held the importance of practical experience in the discussion with Ibn Sina, arguing that practical experiment in relation to thought-taking gives more reliable information, and that thought-reasoning can change with word-of-mouth and lose its original meaning. Hegel understands that cognition is multi - stage, " there is always a difference between the results of the universe in the process of cognition and the goal set, that is, the results achieved do not reach the goal, as a result, the view of the subject is also changing based on comparing the result achieved by what

the connoisseur wants, and in this way new knowledge The experimental method is most significant when students test the nature of physical laws and phenomena, quantitative connections between different physical magnitudes, theoretical acquired knowledge in practice, in which students have the opportunity to test the theoretical knowledge they possess in practice.
In practice, in most cases, experiments in physics and measurements of physical magnitudes are carried out in laboratory training. Therefore, laboratory training is important in shaping students ' competencies regarding conducting experiments, measuring physical magnitudes, and drawing conclusions. Therefore, the qualitative and effective organization of laboratory training gives students the opportunity to form the above-mentioned competencies. When this issue is approached from a didactic and educational position, it implies the formation of the following experimental skills of students in laboratory classes conducted in physics: introduces the foundations of physical phenomena and their laws;
- forms performance competencies with modern physical measuring instruments;
- introduces methods of physical measurement and methods of processing experimental results;
- teaches to calculate absolute and relative errors in physical measurements, to graphically describe the results;
- forms the creative abilities of students (design, assembly of technical devices, study of the principle of their operation, leveling tools);
- strengthens the theoretical acquired knowledge of students with practice, forms the competence to draw scientific conclusions, etc.k.
Experiments conducted in physics can be conditionally divided into two, these are:
- demonstrative experiments;
- laboratory experiments.
In demonstrative experiments, some physical phenomenon or process is represented figuratively. For example, the phenomenon of diffusion can be explained by spraying an ATR or some harmless liquid into the air to give a visual explanation to readers, adding a dye or a substance that quickly interferes with the water and can change the color of the water. It is also possible to explain the reciprocal friction of different polar magnets and the push of the same polar ones, the structure of the heat engines and the working prinsp by demonstrating the model of the internal combustion engine.
In most demonstrative experiments, determining the quantitative value of some physical magnitude is not a primary goal, and there is usually also no possibility of making physical measurements through such demonstratives. At the same time, it is also possible to carry out measurement work of demonstration experiments as a physical practicum. For example, experiments such as estimating the size of molecules using a mechanical model, studying thermal equilibrium in bodies have covered some aspects of laboratory experiments. In secondary schools, similar topics are given as practical training. Demonstration of demonstrative experiments is a method that is extremely useful in students ' understanding of physical phenomena and processes.
Laboratory experiments, on the other hand, are a method that covers some elements of a demonstrative experiment in itself and allows physical measurements to be made. Typically, laboratory experiments in physics are carried out according to the following algorithm.
- purpose of work;
- necessary tools and equipment;
- performance of work;

- test questions.

In most laboratory work, the study of determining a physical magnitude in a laboratory setting is put as the goal of the work. This involves teaching students an experimental way to measure physical magnitudes. Once the purpose of the work is determined, students are introduced to the tools and equipment they will need to carry out laboratory work. Knowledge of the structure and principles of operation of instruments and equipment serves as an important element in the formation of physical magnitude measurement competence in students. First of all, students should find out the difference between a physical instrument and a physical device. In our observations, it turned out that most students do not know the difference between them.

It is known that a physical instrument will be intended to measure the quantitative value of some physical magnitude. For example, it is possible to measure length or distance using a ruler, mass using scales, time using a stopwatch, current strength using an ammeter. The equipment, on the other hand, can be devices or objects used to perform laboratory work, and they do not measure the quantitative value of any physical magnitude. But, in physical measurements, instruments and equipment cannot perform their functions without each other. For example, if we want to determine the electrical power of the bulb, in addition to measuring instruments such as the voltmeter and the ammeter, the connecting wires, rheostat, current source, bulb, electrical switch, etc.k.we are obliged to use the S. So, in physical measurements, the goal is achieved only if instruments and equipment are used together.

Once students are familiar with the tools and equipment required to measure physical magnitudes, they must thoroughly study the procedure for performing the work. Because, if the algorithm for performing the work is broken, it is possible that the expected results will not be met and damage to the tool and equipment, even causing a state of disrepair. In practice, this happens more often in the processes of performing laboratory work on electromagnetism. Therefore, it is necessary for students to also follow the rules of Technical Safety.

In the process of studying the procedure for performing work, it is necessary for students to thoroughly understand both the mathematical formula for determining the physical magnitude (usually referred to as the working formula) and the physical content of the magnitudes involved in this formula.

After a thorough study of the procedure for performing work by students, it is on this procedure that laboratory work should be carried out. Students in this process see with their own eyes the confirmation of the theoretical knowledge they have acquired in practice, and most importantly, these affirmations are carried out by them themselves. From a psychological point of view, if a person (especially young people) performs the discovery of a famous scientist in an experiment and realizes his essence, then his psyche develops self-confidence and motivation, and his interest in science rises to a high level. In fact, the achievements of Science and technology that humanity has achieved today are primarily the result of vital necessity and enormous interests.

Students must receive at least 3 values of physical magnitude or magnitudes that must be determined during laboratory transfer. This is because it is necessary to be explained by the reader in the first laboratory lessons. Students should also have a thorough understanding of the methods of calculating the average size, absolute and relative error in measurements, as well as the skill of drawing up a table, being able to graphically describe the results obtained. This gives the opportunity to draw a correct and, in essence, deep conclusion about the work of the laboratory. As you know, in physics, a graph is an aspect that is extremely important to understand in an figurative way the law of interconnection between at least two physical quantities. In general, the conclusion made as a result of laboratory

measurements shows in itself the confirmation of theoretical knowledge in practice, while expressing the most important and significant aspects of physical reality. The formulation of these aspects in students is currently the most painful problem in physics education. This is observed not only in students of academic lyceums of internal affairs, but even in students of academic lyceums and specialized schools, where physical science is taught in depth. We can see this clearly in the Science Olympiads, which are held in one physical science.

Currently, our pedagogical observations have shown that in the academic lyceums of Internal Affairs, students are not sufficiently used by the existing possibilities of conducting experiments from physics, measuring physical magnitudes and forming competencies for drawing conclusions. It seems to us that this is caused by the next:

first of all, since the academic lyceums of internal affairs are aimed at deepening and teaching social and humanitarian Sciences, the scarcity of the clock allocated from physics to laboratory training;

secondly, a lack of laboratory equipment or a moral obsolescence;

thirdly, the fact that physical educators do not use modern teaching methods effectively etc.

Finding solutions to the above existing problems requires a specific style, requiring creative search from the teacher and a non-linear burnout in education. In our opinion, the role of "mobile applications"in solving these problems is considered important. Because, given the time distribution allocated to science, this approach is considered effective.

When students perform experiments or laboratory work in a virtual way, skills are formed in a certain sense so that they can carry out the work in practice. To do this, the work of mobile software applications, which gives the opportunity to form general competencies related to physical science, requires the development of a methodological system for its exit and practical use.

References:

1. Najmiddinov, M. K. Formation of students' subject competencies in the field of physics with the help of virtual laboratory work. ISJ Theoretical & Applied Science, 2023, 11 (127), pp. 189-191.
2. Axmedov Yo.O. Formation of information and didactic skills of future physics teachers. ISJ Theoretical & Applied Science, 2023. 11 (127), pp. 204-207.
3. Bekpo'latov U.R. The dissymmetry of religion, philosophy and sciences in the formation of a unified scientific worldview. ISJ Theoretical & Applied Science, 11 (127), 2023, pp.286-291.
4. Bekpo'latov U.R.. Materiyaning turli ontologik darajalarida simmetriya va uning buzilish qonunlari. Ilm sarchashmalari, 2023 yil, 37-43 b.
5. Bekpulatov U. Worldview aspects of symmetry and conservation laws in thermodynamics. ACADEMICIA An International Multidisciplinary Research Journal. India, Vol. 11, Issue 10, October 2021. pp. 1327-1335.
6. Bekpulatov U. R. Physical style of thinking - methodological basis for the formation of a scientific worldview. ISJ Theoretical & Applied Science, 2020. 09 (89), pp. 183-188.
7. А.А.Ахмедов, Э.А.Кудратов, Д.М.Холов. "Инновационные Технологии В Науке И Образовании" сборник статей победителей международной научно-практической конференции. 2016. Издательство: Наука и Просвещение. Пенза.
8. Б.Ф.Избосаров, А.А.Ахмедов, И.Р.Камалов. "Инновационные подходы к проведению лабораторных работ по физике". Новые технологии в образовании. 106-109.

9. E.N.Xudayberdiyev. “Bo‘lajak fizika o‘qituvchilarini tayyorlashda olamning fizik manzarasi bo‘yicha tasavvurlarni shakllantirish”. Academic research in educational sciences. 2021.
10. A.K.Kutbeddinov. “Generalization of uranium radio features in teaching natural sciencesak”. Молодые ученые. 2023. 129-134.
11. I.R. Kamolov, G.I. Sayfullaeva -Formation of teacher’s competence in the performance of laboratory and experimental works Journal of critical reviews. ISSN-2394-5125, 2020
12. D.I.Kamalova, S.N.Abdisalomova. “Zamonaviy innovatsion ta’lim”. Journal of universal science research. Volume 1. Issue 1. 17 january, 2023. pp. 187-189.
13. Сарвиноз Тулкуновна Баракаева, Гулхаё Ихтиёровна Сайфуллаева, Сайибжан Садыкович Негматов, Нодира Сайибжановна Абед, Ихтиёр Рамазонович Камолов, Дилнавоз Ихтиёровна Камалова Методика получения композиционных образцов на основе термореактивных фурано-эпоксидных полимеров и органоминеральных наполнителей Universum: технические науки, 2021 1-1 (82) 42-45
14. L.K.Samandarov, E.N.Xudayberdiyev. Methodological problems of teaching the theory of particle-wave dualism for physics students. Theoretical&applied science. Теоретическая и прикладная наука. 256-262.
15. U.R.Bekpulatov. “Physical style of thinking-methodological basis for the formation of a scientific world view”. Theoretical&Applied Science. 09(89). 183-188.
16. Ҳамроева Севара Насриддиновна, Камолов Ихтиёр Рамазонович. “Педагогика олий таълим муассасаларида бўлажак физика фани ўқитувчиларининг мантиқий фикрлаш қобилиятини stem таълим дастури асосида ривожлантириб ўқитишни такомиллаштириш”. Science and innovation International scientific journal. volume 1. issue 6. UIF-2022. 2181-3337.
17. Каримова Ойниса Абдимуминовна. Активизация креативного мышления учащихся на уроке физики Традиции и новации в профессиональной подготовке и деятельности педагога. 227-229.
18. Azzamova Nilufar Buronovna, Nasriddinov Komiljon Rahmatovich. Electrodynamics As A Basis For Consolidating Knowledge Of Electromagnetism. Solid State Technology. 4(63). 5146.
19. У.Д.Шеркулов, А.М.Музафаров, Т.И.Солиев. Determination of mixing factors of daughter radionuclides in the uranium decay chain. Neuroquantology. September. 2022. Volume 20. Issue 11. London.
20. Sh.E.Khalilov, J.M.Khakkulov Z.Sh.Temirov. “Electrochemical Reduction Of Macroiones As A Surface-Active Nanocoating And Nanocomposites”. The American Journal of Applied sciences. 2021.
21. Ж.М.Абдуллаев, Л.И.Очилов. “Изъятие пресной воды из подземных вод при помощи гелиоустановки водоносного опреснителя”. Молодой учёный научный журнал. 2015/5. 274-276.
22. F.Nabiyeva. Issiqlik hodisalarini o‘qitishga oid umumiy metodik tavsiyalar. «Science and innovation». 446-449.
23. Tursunboy Izzatillo ugli Soliyev, Amrullo Mustafoyevich Muzafarov, Bahriddin Faxriddinovich Izbosarov. Experimental determination of the radioactive equilibrium coefficient between radionuclides of the uranium decay chain. International Scientific Journal Theoretical&Applied Science. 801-804.
24. L.X.Turabova, D.I.Kamalova. Fizika fanini o’qitishda elektron o’quv qo’llanmalardan foydalanishning ahamiyati. “Polish science journal”. Warsaw, Poland. Issue 4(37). April. 2021. pp. 222-225.

25. С.С.Канатбаев, И.Р.Камалов, Д.И.Камолова, Г.И.Сайфуллаева. “Universum: технические науки”. Россия. Декабрь, 2016. №12(33). 38-40 стр.
26. Хушвақтов Бекмурод Нормуродович. “Innovative Fundamentals of Non-Traditional Teaching (on The Example of The Optics Department)” Journal of Ethics and Diversity in International Communication”. e-ISSN: 2792-4017. www.openaccessjournals.eu. Volume.1 Issue.3.
27. A.R. Sattorov G. I. Sayfullaeva, Methodology of Application of Innovative Educational Technologies from Astronomy to Laboratory Activities 2021/10/29 European Journal of Life Safety and Stability (2660-9630) 125-128
28. O’.K.Sunnatova, G.I.Sayfullayeva. Making a vacuum cleaner using the stem education system in students' laboratory classes. Web of Discoveries: Journal of Analysis and Inventions. 2023. 43-47.
29. Sayfullaeva Gulkhayo Ikhtiyor Kizi, Shodiev Khamza Ruziculovich, Xaitova Shakhnoza G’olibjon Kizi Conditions For The Formation Of Teaching Innovation Activities Journal of Pharmaceutical Negative Results, 2023 2420-2423
30. Э. А. Кудратов Э. А. Аллаберганова, Г. М., Кутбеддинов, А. К., Каримов, А. М., Интерактивные методы обучения студентов естественных специальностей на основании радиационных факторов экосистемы. Педагогика и современность ISSN: 2304-9065
31. B. I Xojiyev, N.A. Ulugberdiyeva, AA Xo’jayev, AA Amonov Studying the transition processes in physics lessons Galaxy International Interdisciplinary Research Journal 10 (5), 873-876, 2022
32. Bobir Makhammadov The usage of android operating system mobile application terms in the russian language Proceedings of International Conference on Scientific Research in Natural and Social Sciences 2023/2/4 246-251
33. Bozorova Aziza : Sayfullayeva Gulhayo Ixtiyor qizi Astronomiyadan stem dasturidan foydalanib quyosh soati mavzusini o’qitish - Yosh tadqiqotchi jurnali, 2022 35-38.