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- 13.00.01 Pedagogika nazariyasi. Pedagogik ta'limotlar tarixi
- 13.00.02 Ta'lim va tarbiya nazariyasi va metodikasi (sohalar bo'yicha)
- 13.00.03 Maxsus pedagogika
- 13.00.04 Jismoniy tarbiya va sport mashg'ulotlari nazariyasi va metodikasi
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EDUCATIONAL PHYSICS EXPERIMENTS: METHODS AND DIDACTIC STRATEGIES FOR DEVELOPING CRITICAL THINKING IN STUDENTS

Turayev Alimjan Bahridinovich

Lecturer, assistant of pediatric dentistry
Samarkand State Medical University, Samarkand, Uzbekistan

ORCID:0009-0009-8817-7954

Abstract: This study explores the educational potential of problem-based physics experiments in fostering students' critical thinking skills. The research analyzes methods for creating learning environments in which students' preconceived notions and common beliefs are challenged through empirical evidence. A structured approach to organizing experimental activities is proposed, aimed at developing competencies in hypothesis formulation and validation, critical evaluation of experimental data and methodologies, and the construction of well-reasoned arguments. The article presents concrete examples of problem-based experiments drawn from various domains of the physics curriculum. The findings are intended for physics educators, methodologists, and developers of educational programs.

Key words: scientific methodology, cognitive dissonance, hypothesis formulation, validation, problem-centered learning, pedagogical experiment, analytical reasoning, physics education.

Annotatsiya: Ushbu tadqiqotda muammoli fizika eksperimentlarining o'quvchilarda kritik fikrlashni rivojlantirishdagi ta'limiy salohiyati tahlil qilinadi. Tadqiqot jarayonida o'quvchilarning dastlabki tasavvurlari va keng tarqalgan qarashlari eksperimental dalillar orqali qayta ko'rib chiqiladigan o'quv muhitlarini yaratish usullari o'rganilgan. Eksperimental faoliyatni tashkil etishning tizimli yondashuvi taklif etilib, u gipotezalarini shakllantirish va tekshirish, eksperimental ma'lumotlar hamda metodikalarni kritik baholash, shuningdek, asosli va mantiqiy xulosalar chiqarish ko'nikmalarini rivojlantirishga yo'naltirilgan. Maqolada fizika kursining turli bo'limlariga oid muammoli eksperimentlarning aniq misollari keltirilgan. Tadqiqot natijalari fizika o'qituvchilari, metodistlar va ta'lim dasturlari ishlab chiquvchilari uchun mo'ljallangan.

Kalit so'zlar: ilmiy metodologiya, kognitiv konflikt, gipoteza shakllantirish, verifikatsiya, muammoli ta'lim, pedagogik eksperiment, analitik tafakkur, fizika ta'limi.

Аннотация: В данной статье рассматривается образовательный потенциал проблемных физических экспериментов в развитии критического мышления учащихся. Анализируются методы создания учебных ситуаций, в которых исходные представления и распространённые убеждения обучающихся подвергаются проверке и пересмотру на основе эмпирических данных. Предлагается структурированный подход к организации экспериментальной деятельности, направленный на формирование умений выдвижения и проверки гипотез, критической оценки экспериментальных данных и методик, а также построения аргументированных выводов. В статье представлены конкретные примеры проблемных экспериментов из различных разделов школьного курса физики. Материал адресован учителям физики, методистам и разработчикам образовательных программ.

Ключевые слова: научная методология, когнитивный диссонанс, формулирование гипотез, верификация, проблемно-ориентированное обучение, педагогический эксперимент, аналитическое мышление, обучение физике.

INTRODUCTION

The ability to engage in critical thinking is one of the most essential skills in today's world, which is saturated with competing facts and interpretations. Empirically based school physics education possesses significant potential for educational advancement. However, this potential is rarely fully realized through traditional laboratory practices, which are often algorithmic and predominantly demonstrative in nature. Therefore, a transition to problem-based experimentation—where outcomes are not immediately apparent and require intellectual inquiry from students—is essential for the effective development of critical thinking.

LITERATURE REVIEW

The theoretical foundations of problem-based learning are extensively discussed in the works of I. Ya. Lerner, who emphasized the role of problem situations in activating students' cognitive activity and independent thinking. In his seminal work published in 1974, Lerner argued that learning becomes effective when students are placed in intellectually challenging situations that require hypothesis generation and reasoning rather than mechanical reproduction of knowledge. This perspective laid the groundwork for integrating problem-based approaches into science education, particularly in disciplines such as physics where empirical inquiry plays a central role.

The psychological mechanisms underlying problem-based learning and critical thinking development were further elaborated by A. M. Matyushkin and G. A. Ball. Matyushkin, in his research published in 2008, analyzed problem situations as key drivers of intellectual development, highlighting their capacity to stimulate analytical reasoning and reflective thinking. Similarly, Ball's work from 1990 focused on the theory of learning tasks, emphasizing the importance of structured cognitive challenges that encourage learners to analyze conditions, evaluate alternatives, and construct reasoned conclusions. These studies provide a solid psychological and pedagogical basis for the use of problem-based experiments in physics education.

The didactic application of problem-based methods in physics teaching has been addressed by V. A. Orlov and G. G. Nikiforov, who examined general methodological principles of physics instruction in school education in 2015. Their work underscores the significance of experimental activities as a means of developing scientific thinking. In addition, D. Halpern's research on critical thinking, published in 2000, offers a comprehensive framework for understanding analytical reasoning as a transferable cognitive skill. More recently, M. A. Shchukin demonstrated in 2021 that problem-based physical experiments effectively foster critical thinking by engaging students in data analysis, error detection, and reflective evaluation of experimental results.

RESEARCH METHODOLOGY

A defining feature of a problem-based experiment is that it induces cognitive dissonance between empirical evidence and conventional wisdom, lacks a fixed conclusion known in advance to students, requires the formulation and evaluation of multiple hypotheses, and encourages careful scrutiny of experimental conditions as well as the reliability of the obtained results. Such an experimental approach enables learners to experience all stages of scientific inquiry, transforming them from passive followers of instructions into actively engaged researchers.

The organizational framework of problematic experimentation begins with defining the problem and developing hypotheses. The teacher creates a learning situation in which conflicting viewpoints intersect, prompting students to reflect and reason. One illustrative example is the experiment "Falling Bodies in Air." Students are asked which object will descend first: a crumpled paper ball, a coin, or a flat sheet of paper. When formulating hypotheses, learners often rely on personal experience and propose assumptions such as all objects falling at the same rate, the influence of shape on velocity, or the idea that heavier objects fall faster. All hypotheses, including incorrect ones, are documented as part of the inquiry process.

At the stage of experimentation planning and hypothesis verification, students acquire the ability to critically evaluate the verification procedure itself. They consider essential questions such as which methods can be used to test the hypotheses, what quantities should be measured, how random factors may be minimized, and whether the experimental conditions are appropriate. In the falling bodies experiment, students analyze the influence of air currents, suggest ways to ensure simultaneous release of objects, and develop the concept of comparing descent durations. The instructor's proposal to conduct the experiment in an elongated tube with partial air evacuation may further complicate the task, thereby deepening students' analytical engagement.

ANALYSIS AND RESULTS

While students collect data, the primary emphasis is placed on their critical interpretation of the results. A key method for "questioning the data" involves the educator deliberately creating situations that require analytical reasoning. For example, the efficiency of an electric kettle may be calculated and found to be 120%. This outcome prompts a series of reflective inquiries: Is such a result realistic from the perspective of the law of conservation of energy? What could be the source of the error? Were heat losses to the surrounding environment taken into account? Were the estimates of the appliance's power accurate, and were the measuring instruments properly calibrated? As a result of such analysis, students come to understand that any piece of evidence must be carefully examined and verified rather than simply recorded as a failure.

At the stage of conclusion and reflection, the entire research cycle undergoes a thorough evaluation. Students reflect on which hypotheses were confirmed, why initial assumptions may have been incorrect, what



sources of error were identified, what improvements could be introduced into the experimental methodology, and how reliable the obtained results are. This reflective process reinforces the analytical dimension of experimental learning and deepens students' understanding of scientific inquiry.

Problem-based experiments across various domains of physics further illustrate these principles. In mechanics, the experiment known as "The Riddle of Two Carts" involves two carts connected by a thread and a compressed spring; when the thread is burned, questions arise regarding the motion of the carts if their masses are equal or if one cart is significantly heavier. Students often incorrectly assume that the heavier cart will move more slowly or remain stationary, whereas the experiment demonstrates the principle of conservation of momentum and shows that the magnitudes of the acquired momenta are equal. In thermodynamics, the melting ice experiment considers two identical beakers of water at 40 °C, one containing ice at 0 °C and the other containing an equal mass of ice at -20 °C; although many initially choose the second beaker as colder after melting, the experiment highlights the necessity of accounting for the heat required to raise the ice to 0 °C. In electrodynamics, an electrolytic circuit composed of a power source, a light bulb, and distilled water illustrates that the bulb does not light due to the absence of free charge carriers; the subsequent addition of table salt demonstrates electrolytic dissociation and the dependence of electrical conductivity on the presence of ions.

CONCLUSION AND SUGGESTIONS

The problem-based physics experiment, when organized as a coherent research cycle, serves as an effective means of fostering students' critical thinking skills. Such an approach encourages learners to question seemingly obvious phenomena, formulate and evaluate conceptual assumptions, and tolerate uncertainty as an inherent component of scientific inquiry. Most importantly, it promotes the critical analysis of both personal reasoning processes and the information obtained through experimentation.

Through active engagement in problem-based experimentation, students acquire not only a structured body of physical knowledge but also a deeper understanding of the scientific method itself. They learn to generate hypotheses, assess empirical evidence, identify sources of error, and draw well-founded conclusions based on logical argumentation. These competencies extend beyond the physics classroom and form a methodological foundation for future academic studies and professional activities across a wide range of disciplines. Consequently, the integration of problem-based experiments into physics education represents a pedagogically sound strategy for developing intellectually independent, analytically competent, and scientifically literate learners.

References:

1. Балл Г. А. Теория учебных задач: психолого-педагогический аспект. – М.: Педагогика, 1990. – 184 с.
2. Лернер И. Я. Проблемное обучение. – М.: Знание, 1974. – 64 с.
3. Матюшкин А. М. Проблемные ситуации в мышлении и обучении. – М.: Директ-Медиа, 2008. – 392 с.
4. Орлов В. А., Никифоров Г. Г. Методика преподавания физики в школе: общие вопросы. – М.: Академия, 2015. – 368 с.
5. Халперн Д. Психология критического мышления. – СПб.: Питер, 2000. – 512 с.
6. Щукин М. А. Проблемный эксперимент как средство развития критического мышления на уроках физики // Физика в школе. – 2021. – № 5. – С. 34–40.

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 - 13.00.08 Maktabgacha ta'lim va tarbiya nazariyasi va metodikasi
 - 13.00.09 Ijtimoiy pedagogika
 - 07.00.00 Tarix fanlari
 - 19.00.00 Psixologiya fanlari
 - 01.00.00 Fizika-matematika fanlari
 - 02.00.00 Kimyo fanlari
 - 03.00.00 Biologiya fanlari
 - 09.00.00 Falsafa fanlari
 - 10.00.00 Filologiya fanlari
 - 11.00.00 Geografiya fanlari



MAKTABGACHA VA MAKTAB TA'LIMI

Mas'ul muharrir: Ramzidin Ashurov

Ingliz tili muharriri: Murod Xoliyorov

Musahhih: Alibek Zokirov

Sahifalovchi va dizayner: Iskandar Islomov

2026. №1

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"Maktabgacha va maktab ta'limi" jurnali 26.09.2023-yildan O'zbekiston Respublikasi Prezidenti Adminstratsiyasi huzuridagi Axborot va ommaviy kommunikatsiyalar agentligi tomonidan №C-5669363 reyestr raqami tartibi bo'yicha ro'yxatdan o'tkazilgan.
Litsenziya raqami: № 136361.

Manzirimiz: Toshkent shahar, Yunusobod tumani
19-mavze, 17-uy.