

compliance with complex learning objectives, a comprehensive representation of the natural material, the optimum ratio of knowledge about nature and their practical use, the presence of *obscheestestvennyy* component including material other subjects.

Significant attention is paid to methodical apparatus of the textbook that plays significant role in organization of schoolchildren learning the material. The main ideas are classification of educational objectives through teaching and learning of pupils. Alongside reproductive and productive tasks, the textbooks beginning with those for junior schoolchildren include creative tasks, which presuppose applying their knowledge in new situations.

In article revealed the function tutorial. The role and functions of extra-text components of the textbook have been exposed, the dominant of which being assigned to illustrations. The illustrative material as a structural component of the natural science textbook is called to realize the main functions of a textbook, namely, informational, developing, educational, and forming.

**Keywords:** *elementary school, natural science textbook, teaching requirements, learning objectives, natural material, a system of exercises and tasks.*

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## **THE INPUT OF THE INSTITUTE OF PEDAGOGY IN THE DEVELOPMENT OF THE HOMELAND TEXTBOOK ON PHYSICS**

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The article deals with the question of the theory and the practice of creating a textbook on Physics for the secondary schools. The features of this process in the history of Soviet didactics of physics, the impact of the cultural factors on the development of the requirements for the content and the methodological apparatus of a textbook on Physics were investigated. Much attention was focused on the need to create the national research traditions of a textbook on Physics and the possibility of using the historical and didactic experience to improve the situation with the technology development of a textbook on Physics for a secondary school. The role of the Ukrainian Research Institute of Pedagogy in the formation of the methodological principles of a textbook on Physics, the contribution of the representatives of the national guidance science who created

the original methodology of Physics teaching at school were justified. The value of the modern researchers at the Institute of Pedagogy in the development of the textbooks on Physics as a means of displaying the content of school education, one of the mechanisms of the State Standard of the full secondary education was demonstrated. The systematic process of creating homeland textbooks on Physics and the weighty contribution of the Institute of Pedagogy at various stages of the development of school physics education and pedagogy was justified.

**Keywords:** *history of didactics of physics, the Ukrainian Research Institute of Pedagogy, content of teaching Physics, Institute of Pedagogy, textbook on Physics.*

**The problem statement.** One of the leading branches of the modern theory and methodology of teaching Physics is the academic substantiation of the didactic basis of the development of the textbook on Physics as one of the ways of the introduction of the content of the educational branch «Natural Studies», its components as well as the concretization of the state requirements to the pupils' academic level. Nowadays a textbook is considered as an important means of the formation of the secondary schoolchildren's key and subject competences in Physics.

In accordance with the Concept which was confirmed by the Ministry of Education and Science of Ukraine in August, 2013, one of the significant conditions for the introduction of the profession-oriented studying in the high school is considered to be the creation of the system of educational and methodological provision which is oriented at the competence- and activity based as well as student-centered teaching. Searching for the new approaches to include the content and the didactic systems in the textbooks on Physics, an integral role is played by the historical and didactic analysis of the development of the homeland textbooks creation, the determination of the place of the leading scientific institutions which had a considerable impact on this process. In this context, the issue of the generalization of the experience of the Institute of Pedagogy of the National Academy of Pedagogical Sciences of Ukraine in the sphere of the creation of the textbooks on Physics is topical, and it can be used with the purpose of updating the school physics education and the creation of the modern textbook.

**The analysis of the recent researches.** The works of L. Yu. Blahodarenko, O.I. Buhaov, S.U. Honcharenko, O.I. Lyashenko, M.T. Martynyuk, M.I. Shut, the leading scientists, are devoted to the scientific explanation of the usage of the textbook on Physics as an integral system. Therefore, L. Yu. Bondarenko determines the necessity of the scientific approach; first of all, in accordance with it, the new generation of the textbook on Physics is a means of the guarantee of the basic elements of the pupils' educational activity aimed at their development and upbringing [2]. In the works of O.I. Lyashenko, a modern textbook is considered as an important motivational factor which stimulates a pupil to study the subject [6]. M.I. Shut puts an emphasis on the priority of the upbringing function of the textbook on Physics [14].

The development of the theoretical basis of the new-type textbook on Physics requires taking into consideration the experience and the traditions of the homeland

process of creating textbooks. The role of the Institute of Pedagogy of the National Academy of Pedagogical Sciences of Ukraine (the Ukrainian Research Institute of Pedagogy, the Research Institute of Pedagogy of USSR) was historically objective in this process as it was the profound scientific institution which had been a leader in the sphere of the researches on the theory and the methodology of teaching Physics in Ukraine during almost 90 years of its functioning.

Certain aspects of the development of the textbook on Physics in the end of 1990-s in the context of the abovementioned issue were studied by N. L. Sosnytska [12] whereas the earlier periods of the history of the homeland didactics of Physics were not the subject of the historical and methodological analysis and generalization. In our research, the works on the history of the methodology of Physics in Ukraine by O. K. Babenko and M. Y. Rozenberg, the professors, are of special scientific interest [1].

**The aims of the article (problem definition).** That is the reason why in the article, the tasks are based on the study and the analysis of the legislative documents, archive sources, published materials on the problems of the development of the homeland textbook on Physics as well as the study of the input of the scientists of the Institute of Pedagogy for the solution of this problem.

**The main part.** The integral role of the Ukrainian Research Institute of Pedagogy (URIP) in the development of the traditions of the homeland creation of textbooks on Physics is explained by the idea of the foundation of this institution in the People's Commissariat on Education of Ukraine, the work of the best scientific and pedagogical staff on Physics methodology. However, the historical and methodological researches on this issue are not in-depth because of the challenges in the interpretation of the development processes of the homeland science and education by the traditional historiography, in particular. Therefore, in his historical sketch (1958), O. K. Babenko, the Professor, draws attention to the role of V. A. Frankovs'kyi, who had been a researcher and an academic correspondent of the Ukrainian Research Institute of Pedagogy for a long period of time in the creation of a stable textbook on Physics for the school with seven years of studying [1, p. 101].

The investigation of archive sources, legislative and published documents gives an opportunity to make a conclusion on the sequence of the development of the theory and practice of a textbook in the history of the homeland didactics of Physics and the significant role of the Institute of Pedagogy in this process.

In 1926, the State scientific-methodological committee of the People's Commissariat on Education prepared *A Textbook in the Public School of USSR*, a collection of methodological materials. An issue of the creation and the usage of the textbook on Physics was developed by R. D. Ponomaryov, the professor, the head of the department of the methodology of Physics of the Institute of Public Education in Kharkiv and a researcher of URIP. In this collection, the principal requirements to the textbook for the labor and the professional school were formulated in this collection [10, p. 7 – 8].

In the second half of 1920s, the tender for the textbooks of the labour school takes place. The authors of the first textbooks on Physics which had won the tender of the People's Commissariat of Education were the following: L. I. Leushchenko, R. D. Ponomaryov, V. A. Frankovs'kyi.

In 1926-1927, *Environmental Physics*, the textbook on Physics for the rural school, the textbooks for the urban schools with seven years of studying by L. I. Leushchenko as well as the textbook *Physics in Nature and Life* by V. A. Frankovskiyi were published.

R. D. Ponomaryov, the professor, the head of the group of physicists in the Ukrainian Research Institute of Pedagogy creates *A Brief Course in Physics, the Fundamentals of Mechanics and Electric Engineering*, which had been one of the best homeland textbooks on Physics for the industrial professional schools during a long period of time.

In 1928, the Scientific and Methodological Committee confirmed to discuss the requirements to the textbook on Natural Law developed by the scientists of the Ukrainian Research Institute of Pedagogy. The main tasks of the school subject of natural law which combined Physics, Astronomy, Chemistry as well as Mineralogy and Geology, Botanic, Zoology, Biology, Anatomy, Physiology included the formation of the scientific and materialistic outlook and activation of studying.

The basis for the creation of the textbooks on Physics was the productivity principle. Meanwhile, a textbook had to provide certain pieces of knowledge in the sphere of the actual material and scientific generalizations in accordance with the program. The division of the educational material in correspondence with the branches of science and the academic years was suggested: Chemistry – 5<sup>th</sup> – 6<sup>th</sup> years, Botanic, Zoology – 5<sup>th</sup> – 6<sup>th</sup> years, Physiology, Anatomy – 6<sup>th</sup> year, Physics – 5<sup>th</sup>, 6<sup>th</sup>, 7<sup>th</sup> years. The approximate requirements to the page numbers of the textbooks on Physics were 20-25 leafs for three years of learning [4].

The formulation of the certain requirements gave the opportunity to improve the process of creating textbooks. L. I. Leushchenko and V. A. Frankovs'kyi joined their forces in one writing team and had created a system of textbooks on Physics for the 5<sup>th</sup>, 6<sup>th</sup>, and 7<sup>th</sup> group of learning at the labor school by 1930. There were three editions of them published in large circulation (for example, in 1930-1931 educational year, it was planned to publish 122 992 textbooks for the 5<sup>th</sup> group, 32 961 textbooks for the 6<sup>th</sup> group, and 49 420 textbooks for the 7<sup>th</sup> group of the labor school) [13].

In 1930, a textbook on Physics for the industrial schools by R. D. Ponomaryov was published. This textbook plays an integral role in the didactic provision of the educational process at the professional school as it includes the whole systematic course of Physics. The textbook written by R. D. Ponomaryov is created in the way to make teaching Physics meet the requirements of the industrial profession-oriented schools from one point of view and comprised all main issues which were studied in the labour school of the II degree with seven years of studying from

another one. They were made more in-depth and, in this way, they guaranteed the concentric structure of the school course of Physics. It gave an opportunity to use a textbook in the professional school of other types, as well.

The conference which covered the problems of creating textbooks for the public school and took place on the 1<sup>st</sup> of December in 1930 was more than important. The priority of the ideological requirements to a textbook which were defined as a means of communist upbringing in the speech of M. O. Skrypnyk is conceptually confirmed. At the conference, the textbooks on social studies for the labour school written by the authors from Kyiv were criticised because of their insularity, formation of the psychological difference in the pupils' understanding of the life in a village and in a town, the usage of the materials from the life of the individual rural household. The main attention was paid to the ideological requirements without taking into account the scientific character and the didactic necessity. Meanwhile, the positive experience in the creation of the textbook on Natural Law was underscored.

In order to comply with the decisions on the reinforcement of the requirements to a textbook for the labour school which were made at the conference and confirmed in the Statement of the 1<sup>st</sup> of January in 1931, the methodological sector of the People's Commissariat on Education established the order of the manuscripts selection for the purpose of the quick review and approval of the textbooks, the guarantee of their ideological orientation and certain methodological framework. The final copies of the textbooks which had been checked in accordance with the commentaries of the reviewers team as well as the individual reviews were provided for the special teams of the methodological sector; it was appraising the manuscripts. With the aim of the manuscripts review, the staff included the representatives of the Radyans'kashkola publishing house, the Ukrainian Research Institute of Pedagogy, the practitioners, the spokesmen of the Soviet party organs. On the manuscript receipt day, the secretary of the methodological sector delivered it to the assistant of the corresponding branch which made the final conclusion on the textbooks quality, subedited it, made certain remarks and marked the necessity to revise the textbook. On the basis of the overall assessment, an approval «To recommend» or «To approve for the usage in the institutions of social upbringing» was made. Three days were staked out for the reviewer's work. The reviewer assigned the manuscript with the corresponding suggestions to the head that convened a committee on the solution of the problem of the approval or the returning for the corrections and the improvement before publishing the textbook [11].

D. M. Skurativs'kyi, the chief of the methodological sector of the People's Commissariat on Education and the head of the department of the public polytechnic school of URIP, was requested to organize the qualification teams. M. Zhydkoblinov, a researcher of the department of the section of the public polytechnic education of URIP was confirmed to be a reviewer in the sphere of Physics.

The procedure of the contest selection of the manuscripts of the textbooks on Physics for the labour school was improved. An important issue was the expertise of the manuscripts of the textbooks written by the specialists of the professional pedagogical research institutions. The review of the textbooks on Physics on their scientific character was made by the scientists of the Institute of Physics of the Ukrainian Academy of Sciences, and their correspondence to the didactic requirements was checked by the specialists of the Ukrainian Research Institute of Pedagogy. M. Zhydkoblinov, the reviewer of the People's Commissariat on Physics Education, guaranteed the contest coordination. The creative staff which provided the textbooks manuscripts for the publishers was gathered. After the analysis of the manuscripts, the publishers sent them to the corresponding sector of the People's Commissariat on Education. The reviewer guaranteed the legislative regulation and sent the manuscripts to the scientific institutions for the reviewing. After the revision and the approval at the tender committee, the manuscripts were sent back to the publishing houses for the further development and taking into consideration the responses and the remarks. In the result of the study of the improved manuscripts, a decision on the approval was made; it was the following: «Allowed to Use», «Approved», «Not Recommended». However, it was possible to refuse to approve the manuscript, but it provided an opportunity to publish a textbook in a publishing house and to use it at the labour school at teacher's will.

The section of the public polytechnic education was charged to develop the common requirements to the textbooks of the labour school. Under the direction of D. M. Skurativs'kyi who finished the postgraduate courses at the section of the labour school and became a researcher, such requirements were developed in a short term and published in March, 1931, in the *Vyrobnycha Dumka* newspaper. A textbook as «a means of the pedagogical process» has to be correspondent to the following demands: ideological substantiation, communistic upbringing, the integral approaches to teaching rural and urban children, polytechnic upbringing, scientific basis, international upbringing, emotionality, connection to the production, book get-up.

The Ukrainian Research Institute of Pedagogy was charged to develop the requirements to the textbooks on certain school subjects. R. D. Ponomaryov, a researcher of the section of the public polytechnic education, chaired the working group in Physics. Together with M. Zhydkoblinov and T. Krylovs'kyi, they were the first who developed the didactic requirements to the textbook in the history of the homeland methodology of Physics. Among the main branches of the selection of the textbook content there were the following ones: its orientation at the demonstration of the physical and technical fundamentals of the modern production on the basis of the industrial and the agricultural production, meeting the requirements of the civil and political upbringing of children. The necessity to use the historical material in the textbook on Physics was underscored; there was a warning concerning the demonstration of the certain scientists' role in the inventions sphere. The textbook on Physics had to be oriented at the laboratory and excursive method of teaching at the labour polytechnic school.

The methodological requirements to the textbook on Physics determined the necessity of the certain minimum of excursions with their developed plan, the introduction of the questions and tasks oriented at the certain production to every chapter; the presence of the samples of the produced models and the examples of the installation and wiring work, bibliographies for a pupil, the development of the methodological recommendations for a teacher except a textbook [7].

One of the first textbooks on Physics which was approved at the tender in accordance with the new requirements in 1931 became a handbook for the 7<sup>th</sup> academic year by L. I. Leushchenko and V. A. Frankovs'kyi. The specialised scientific review of the manuscript was provided by the Institute of Physics of the All-Ukrainian Academy of Sciences in Kyiv. For the first time, the conditions to combine efforts of the academic and the methodological science were made. The importance and the high level of the professional review were guaranteed by O. H. Holdman, the director of the Institute of Physics, the academician, in particularly.

The textbook on Physics for the seventh academic year by L. I. Leushchenko and V. A. Frankovskiy published in 1931 became one of the best homeland textbooks for the labour polytechnic school. It got positive commentaries of the scientists and teachers. The textbook was used not only in the public school with the Ukrainian teaching language but also it was published in Russian and the language of the national minorities. For the 1931-32 academic year, the necessity to publish about 50 000 textbooks in Ukrainian, 9 000 textbooks in Jewish, 3 000 textbooks in Polish, 2 000 textbooks in Bulgarian as well as in other languages of the national minorities was announced [5].

After the adoption of the Regulation of the Central Committee of the Communist Party of the Soviet Union of the 5<sup>th</sup> of September in 1931 on the academic organization at the primary and at the secondary school, the People's Committee of the Soviet republics immediately suggested the organization of the scientific and Marxist review of the programs providing the certain range of systemized knowledge (Native Language, Mathematics, Physics, Chemistry, Geography, History) as well as the start of studying using the reviewed programs.

In December 1931, the People's Commissariat on Education adopts and publishes the new educational programs which were developed by the working teams of the Ukrainian Research Institute of Pedagogy. Scientists and teachers worked on the program on Physics under the direction of R. D. Ponomaryov, the professor. In accordance with the new program, a textbook on Physics for the labour polytechnic school had to be created in an extremely short period of time, and less than six months were left from the adoption of a new educational program, the tender for the textbook on Physics to the provision of it for the publishers and for the review in the People's Commissariat on Education. The issue of the textbook creation was more challenging because of the simultaneous introduction of new textbooks for all grades of the II degree of the labour polytechnic school.

Meanwhile, the first editions of the textbooks on Physics for the 5<sup>th</sup>, 6<sup>th</sup>, and 7<sup>th</sup> academic groups by L. I. Leushchenko and V. A. Frankovskiy had been published

by the new academic year almost without any timeouts. For the purpose of meeting the requirements of the polytechnization of teaching Physics at the labour school and the reflection of the achievements of modern technique in the content of new textbooks, the connection between Physics and technology as well as production, its importance as the basis of the working principle of equipment, O. S. Kyashko, an Associate Professor of the Institute of Public Education in Kyiv, a researcher of the Research Institute of Chemical Engineering, was invited to take part in the creation of the textbook for the 5<sup>th</sup> grade.

In spite of some disadvantages caused by the short creation terms the textbooks on Physics for the seventh academic year, in particularly, which were written by L. Leushchenko, O. Kyashko, V. Frankovskyi became a sample for the systematic representation of the material. As D. Orikhiv marked in his review, the textbook was written «... in a clear scientific way which is comprehensible for the pupils, without any vulgarization...» [11]. These textbooks differ from other ones which were used in the labour polytechnic school by their consistency and material order.

The process of creating a homeland textbook on Physics was unique for its intensiveness and didactic abundance; it lasted for almost a decade and finished in 1933 when the stable programs and textbooks were introduced, and the education system was unified.

**Conclusions.** During 1920-s – the beginning of 1930-s, the development of the didactic basis of creating the homeland textbooks on Physics, in particularly, was present. In this process, an important role was played by the Ukrainian Research Institute of Pedagogy as a leading research institution in the system of the People's Commissariat on Education in Ukraine which guaranteed the scientific substantiation of the content and the methods of the school education. Its scientists took an active part in the formation of the content of teaching Physics at the labor school, the development of the educational programs, the textbooks of Physics of a few generations, the substantiation of the requirements to the textbook on Physics as well as the guarantee of the procedure of the contest selection.

These achievements were rejected because of the introduction of the unified educational programs and the textbooks on Physics. However, the traditions of the Ukrainian Research Institute of Pedagogy themselves in the branch of the development of the textbook on Physics became the fundamentals of the renovation of the process of creating textbooks in future. In particularly, at the beginning of 1960-s, due to the social and cultural development, a new educational program on Physics was aimed at the increase of the academic level of teaching Physics. An opportunity for the creation of the alternative republican textbooks appeared. The team of the authors which consisted of the teachers of the Department of the Methodology of Physics of the O. M. Horkyi State Pedagogical Institute in Kyiv (O. K. Babenko, V. T. Horonovska, Ya. F. Derkach, H. V. Dmytrenko, S. V. Levandovskyi, P. K. Chernyak, M. A. Pushkar, M. A. Cherednyk) and M. Y. Rosenberg, the chief of the Department of the Methodology of Physics of the Research Institute of Pedagogy created the original textbooks on Physics for

the secondary school in 1959-1960. Unfortunately, in spite of the high scientific and methodological level, they were gradually replaced by the traditional stable textbooks.

The researchers of the Institute of Pedagogy played an integral role in the development of the textbook on Physics at the stage of the foundation of the national education system in Ukraine. During 1990-s, the textbooks on Physics by O.I. Buhayov, S. U. Honcharenko, M. T. Martynyuk, V. V. Smolyanets' were created and successfully used. From the second half of 1990-s till 2006, in the comprehensive secondary institutions of Ukraine, the textbooks on Physics were developed under the direction of O. I. Lyashenko, a famous specialist in the branch of didactics of Physics (the authors of it were Ye. V. Korshak, O. I. Lyashenko, V. F. Savchenko).

In 2004, the tender on the educational programs and textbooks for the profession-oriented school took place. The procedure of the manuscript review was implemented; it was guaranteed by the National Academy of Sciences, the Academy of Pedagogical Sciences of Ukraine, the profession-oriented departments of the higher educational establishment. For the purpose of the effective psychological and pedagogical expertise by the institutions of the Academy of Pedagogical Sciences of Ukraine and the Institute of Pedagogy, in particularly, the criteria of the correspondence of the textbook on Physics to the following psychological and pedagogical requirements were developed: the guarantee of the motivation to study a subject by a textbook, the comprehensibility of the textbook content for the pupils of the certain age, the realization of the textbook didactic function, the performance of the textbook developmental function, the performance of the textbook upbringing function, the sophistication of the methodological apparatus. It gave an opportunity to create the textbooks on Physics of new generation.

Modern textbooks on Physics for the secondary and the high school were created by the authors who include the researchers of the Institute of Pedagogy. At the high school, the textbooks created by O. I. Lyashenko, M. V. Holovko, D. O. Zasyekin, T. M. Zasyekina are used. The textbooks on Physics for the 10<sup>th</sup> and the 11<sup>th</sup> grades are experimentally checked; they were written by the researchers of the Laboratory of Mathematical and Physical Education under the direction of L. V. Neporozhnya. The textbook on Physics for the 7<sup>th</sup> grade of the secondary school which were created by D. O. Zasyekin and T. M. Zasyekina in accordance with the new educational program won the tender organized by the Ministry of Education and Science of Ukraine.

Nowadays the professionals of the Institute of Pedagogy of the National Academy of Pedagogical Sciences conduct the systematic study on the theoretical and methodological basis of the creation of the textbook on Physics, the formation of the system of the didactic requirements to its content, functions, and the methodological apparatus. In this process, an important role is played by the annual scientific and practical conference «The Problems of a Modern Textbook»; during its work, the issues of the modern process of creating textbooks on Physics are discussed.

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### **ВНЕСОК ІНСТИТУТУ ПЕДАГОГІКИ У СТАНОВЛЕННЯ ВІТЧИЗНЯНОГО ПІДРУЧНИКА ФІЗИКИ**

У статті досліджуються питання теорії і практики створення підручника фізики для середньої школи. Аналізуються особливості цього процесу в історії вітчизняної дидактики фізики, вплив соціокультурних чинників на розвиток вимог щодо змісту та методичного апарату підручника фізики. Акцентується увага на необхідності дослідження традицій створення вітчизняного підручника фізики та можливості використання історико-дидактичного

досвіду в удосконаленні технологій розроблення навчальної книги з фізики для середньої загальноосвітньої школи. Обґрунтовується роль Українського науково-дослідного інституту педагогіки у формуванні дидактичних засад підручника фізики, внесок представників вітчизняної методичної науки, які створили оригінальні дидактичні системи навчання фізики для трудової школи. Висвітлюється значення сучасних досліджень науковців Інституту педагогіки у розвитку підручника фізики як засобу відображення змісту шкільної освіти, одного з механізмів реалізації Державного стандарту базової і повної загальної середньої освіти. Обґрунтовується системність процесу творення вітчизняного підручника фізики та вагомість внеску Інституту педагогіки на різних етапах розвитку шкільної фізичної освіти та педагогічної науки.

**Ключові слова:** історія вітчизняної дидактики фізики, Український науково-дослідний інститут педагогіки, зміст навчання фізики, Інститут педагогіки, підручник фізики.

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### ВКЛАД ИНСТИТУТА ПЕДАГОГИКИ В СТАНОВЛЕНИИ ОТЕЧЕСТВЕННОГО УЧЕБНИКА ФИЗИКИ

В статье исследуются вопросы теории и практики создания учебника физики для средней школы. Анализируются особенности этого процесса в истории отечественной дидактики физики, влияние социокультурных факторов на развитие требований относительно содержания и методического аппарата учебника физики. Акцентируется внимание на необходимости исследования традиций создания отечественного учебника физики и возможности использования исторического и дидактического опыта в совершенствовании технологий разработки учебной книги по физике для средней общеобразовательной школы. Обосновывается роль Украинского научно-исследовательского института педагогики в формировании дидактических принципов учебника физики, вклад представителей отечественной методической науки, которые создали оригинальные дидактические системы обучения физике для трудовой школы. Освещается значение современных исследований ученых Института педагогики в развитии учебника физики как средства отражения содержания школьного образования, одного из механизмов реализации Государственного стандарта базового и полного общего среднего образования. Обосновывается системность процесса отечественного учебника физики и весомость вклада Института педагогики на разных этапах развития школьного физического образования и педагогической науки.

**Ключевые слова:** история отечественной дидактики физики, Украинский научно-исследовательский институт педагогики, содержание обучения физике, Институт педагогики, учебник физики.