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SCIENCE AND EDUCATION: PROBLEMS, PROSPECTS AND INNOVATIONS



**PROCEEDINGS OF VII INTERNATIONAL
SCIENTIFIC AND PRACTICAL CONFERENCE
APRIL 1-3, 2021**

**KYOTO
2021**

SCIENCE AND EDUCATION: PROBLEMS, PROSPECTS AND INNOVATIONS

Proceedings of VII International Scientific and Practical Conference

Kyoto, Japan

1-3 April 2021

Kyoto, Japan

2021

UDC 001.1

The 7th International scientific and practical conference “Science and education: problems, prospects and innovations” (April 1-3, 2021) CPN Publishing Group, Kyoto, Japan. 2021. 1135 p.

ISBN 978-4-9783419-5-2

The recommended citation for this publication is:

Ivanov I. Analysis of the phaunistic composition of Ukraine // Science and education: problems, prospects and innovations. Proceedings of the 7th International scientific and practical conference. CPN Publishing Group. Kyoto, Japan. 2021. Pp. 21-27. URL: <https://sci-conf.com.ua/vii-mezhdunarodnaya-nauchno-prakticheskaya-konferentsiya-science-and-education-problems-prospects-and-innovations-1-3-aprelya-2021-goda-kioto-yaponiya-arhiv/>.

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Collection of scientific articles published is the scientific and practical publication, which contains scientific articles of students, graduate students, Candidates and Doctors of Sciences, research workers and practitioners from Europe, Ukraine, Russia and from neighbouring countries and beyond. The articles contain the study, reflecting the processes and changes in the structure of modern science. The collection of scientific articles is for students, postgraduate students, doctoral candidates, teachers, researchers, practitioners and people interested in the trends of modern science development.

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UDC: 378.091.212:347.471.6:378.6:61(477.54-25)XHMY(06)

UNITY OF EDUCATION AND SCIENTIFIC RESEARCH – THE MAIN
PRINCIPLE OF KHARKIV NATIONAL MEDICAL UNIVERSITY

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Abstract. One of the principles of organization of the educational-upbringing process in modern institutions of higher education should be the thesis: "through education to science". The student scientific circle helps to solve problems on improvement of quality of preparation of scientists of a medical profile by mastering by students of advanced achievements of medicine, expands and deepens students' knowledge in the field of theoretical disciplines. Development and effective implementation of educational and research work in a higher education institution is a necessary condition for increasing its competitiveness in the international scientific and educational space.

Key words: education, science, educational and research work, student scientific circle, student scientific society.

Introduction. The World Health Organization has introduced this definition of the modern highly qualified physician as a person who "provides care, makes decisions, communicates, manages and takes into account the interests and needs of society". According to the Resolution of the Presidium of the Academy of Sciences

of Ukraine "On the development of science and transformation of society: a concept for Ukraine", the main goal of scientific, scientific-technical and innovative policy of the education system is: effective use of educational, scientific, technical and innovative potential for economic development [1].

It is possible to ensure a completely just desire of our state to integrate into the developed modern society, provided that the intellectual potential of the nation is preserved and increased, which includes students of the Kharkiv National Medical University (KhNMU). We hope not to lose our achievements and at the same time borrow the experience of other medical educational institution of Ukraine, developed foreign countries and introduce advanced methods and the latest technologies in the activities of higher education [2, 3]. The most important moment for the comprehensive integration process in KhNMU is the combination and complementarity of educational, upbringing and scientific processes. Without proper education of our students, it is almost impossible to achieve a harmonious development of personality and form a nationally conscious, with an active life position of a specialist and a citizen. Therefore, the task of higher education in Ukraine is to achieve maximum development of abilities and capabilities of students, as well as to ensure the quality of training at the level of international requirements. In this regard, the teaching staff should apply an individual approach to each student, depending on the creative abilities of future professionals [4, 5]. To activate and optimize the educational process in the study of disciplines "Medical Chemistry", "Bioorganic Chemistry", "Medical and Bioorganic Chemistry", "Analytical Chemistry", as well as the formation of professional thinking in future medical professionals is effective in involving students in student scientific circle (SSC) of the department.

The purpose of the work is to determine the role of scientific-research work (SRW) of a student of a medical institution of higher education (HEI) as an integral factor in the development of student potential, a powerful and reliable means of training scientific staff of the university.

Main part. The SRW of students of HEI is one of the important factors in the training of highly qualified specialists and is carried out in several areas, such as:

- a mandatory element of the educational process, which is provided by curricula and study plans;

- SRW carried out outside the educational process within the student scientific and creative society (student scientific society (SSS), problem research groups, sections);

- participation in scientific and methodical events, such as a conference, Olympiad, exhibition, competition [6].

Today, scientific research is becoming a necessary component of the formation of a highly educated specialist, an integral condition of Ukraine's integration into the European educational space. After all, the main task of higher education is not just the transfer of knowledge, but the creation of favorable conditions for their creative rethinking, which is the basis for the emergence of new scientific ideas. Research activities of both students and practitioners of any category play an important role in the training of highly professional doctors. Since the foundations for the development of a scientist are laid mainly during the study period, very much attention should be paid to encouraging students to SRW. Higher Medical School brings to the fore the problem of training competent medical professionals with responsibility, a lasting interest in the future profession, the desire for self-development and self-realization. It is important to understand that the professional competence of a doctor is formed not only by the subject content of science, but also by the constant improvement of his professional skills [7]. The research work of students begins with the study and is fixed in SRW conducted within the SSS. SRW is the most important means of improving student training – both theoretical and practical. For first-year students, this is an initial step towards research. The most common form of SRW is the work of a student in a scientific circle. At the Department of Medical and Bioorganic Chemistry of KhNMU there is a chemical SSC "Caffeine". The activity of the SSC contributes to the expansion of theoretical horizons and scientific erudition of future specialists, acquaintance of students with the state of development of scientific

problems in various areas, the formation of abilities to apply theoretical knowledge in practice, instilling in students the skills of scientific discussions, etc. [8]. The activities of the SSC "Caffeine" are aimed at developing the creative abilities of students in order to acquire personal, professional and cognitive competencies, as well as professional experience in acquiring knowledge and skills through research. The purpose of the SSC is to provide higher education students with research skills as a universal way of mastering activities, developing the ability to research thinking, activating the personal research position based on the acquisition of subjectively new knowledge.

Students who take part in the meetings of the scientific circle have the opportunity to:

- 1) to get acquainted with the principles, methods, techniques (including modern ones), tools of SRW (including computer programs);
- 2) to develop their creative abilities, speaking at scientific conferences and seminars on the study of topical issues of medical development;
- 3) to take part in the scientific life of the university, publishing articles, abstracts, scientific papers in various scientific journals;
- 4) participate in debates, conferences, "round tables" to discuss current issues of medicine;
- 5) apply in the learning process the experience of research work.

Classes of the scientific circle are conducted by leading teachers of the department who have experience in teaching and research. Each employee of the department supervises student research papers within the SSC "Caffeine".

The department has two student research laboratories. Students are being prepared for the All-Ukrainian Student Olympiads in the discipline of "Medical Chemistry". Much attention is paid to the interdisciplinary links between chemistry and other disciplines. Students of the scientific circle gain experience both in a team and personally, which contributes to the desire to determine their "level" by participating in competitions, exhibitions, contests. The forms of work of SRW are expanding and improving. A significant place in the scientific works of students is

occupied by the latest information technologies, without which effective research is impossible. The main task of SRW of students in the SSC – deepening and creative development of educational material, students acquire skills of independent theoretical and experimental work, acquaintance with modern methods of scientific research, experimental techniques, real working conditions in medical and research teams. Students of the scientific circle gain skills in searching for scientific literature and its analysis, writing abstracts and articles, conducting experiments and evaluating its results, which promotes the development of the ability to think critically, identify, research and solve problems that arise. All this contributes to the development of independence and confidence, forms the ability to find a way out of any unusual situation that so often occurs in the professional activities of the future doctor.

The student`s SRW is encouraged and stimulated both at the level of HEI (optional classes, elective courses, participation in student research groups, student conferences, signing agreements on bilateral exchanges, internships in European HEI, participation in European Union exchange programs ERASMUS) and at the state level levels (receiving grants for research, state quotas for postgraduate and doctoral studies). This form of organization of the educational process allows to form such qualities in students as self-development, the desire to constantly find answers to complex questions, the development of intellectual and creative abilities, the ability to work in a team, which are necessary for specialists in all fields of medicine. The SSC helps to solve problems on improvement of quality of preparation of scientists of a medical profile by mastering by students of advanced achievements of medicine; expands and deepens students' knowledge in the field of theoretical disciplines. Another chain that combines science and education, in our opinion, are students` conferences. Since 2010, the department has a good tradition of holding an interdepartmental conference of first-year student «Chemistry. Ecology. Medicine». In 2019, the X anniversary conference «Chemistry. Ecology. Medicine» for Ukrainian-speaking students, for English-speaking students «Chemistry. Ecology. Medicine». The winners of this conference are recommended to participate in the annual conference of students and young scientists "Medicine of the III millennium"

and other interuniversity, interregional and national events of students and young scientists. Since 2013, the department has been holding an interdepartmental student conference on bioorganic chemistry, since 2014 a conference for undergraduate student, which has become a tradition. One of the principles of organization of the educational process in modern of HEI should be the thesis: "through education to science". In this regard, students, starting from the first year, step by step accumulate knowledge, acquire certain practical skills, including research, and use them in the performance of scientific work: first in the scientific circle, and then in the implementation of dissertation, master's works. Teachers of the Department of Medical and Bioorganic Chemistry of KhMNU work with first-year students, so the main goal is that students need not only to provide a certain amount of fundamental information necessary for further mastering of medical-biological and specialized disciplines, but also to instill, starting with first year, research skills. Achieving this goal is facilitated by the introduction into the learning process of a creative and independent component, computerization, interactive teaching methods.

In the first lesson in the discipline "Medical Chemistry" students are given the task of completing the course work "Chemistry of biogenic elements", which involves the creation of a file on the biogenic role of the twenty most important for the processes of life of chemical elements. This work contributes to the development of the first skills of scientific research: students under the guidance of a teacher learn to work with scientific literature, learn the method of abstracting scientific literature, selecting the most interesting and useful information. Performing course work, our students learn to create multimedia presentations of reports on the biogenic role of individual chemical elements. Another chain that combines science and education, in our opinion, is the organization of laboratory work, which are research in nature. At the Department of Medical and Bioorganic Chemistry in each class of all disciplines studied ("Medical Chemistry", "Bioorganic Chemistry", «Analytical Chemistry: Qualitative and Quantitative Analysis") provides for laboratory experiments [9]. This part of our classes is of great interest to students, because it is clear that a theory that is not supported by practical skills, acquired professional qualities, costs little.

Performing laboratory experiments allows students to integrate theoretical material, practical skills, research experience. The implementation of a laboratory workshop, which allows to learn and evaluate the methods of analysis used in clinical and biomedical research, requires from the student a deep understanding of the method of execution. The degree of readiness of the student to perform laboratory work, we determine by interview, dialogue in accordance with the methods of interactive learning [10]. The interview allows both the teacher and the student to identify certain "highlights" in the performance of the work, without which the experiment will be unsuccessful. For example, in the work "Determination of the hardness of tap water by trilonometric method" we substantiate the creation of an alkaline medium during titration. And researchers are faced with a dilemma: to create this environment by adding alkali, is it necessary to use ammonia buffer solution? Students, analyzing the properties of calcium, magnesium hydroxides, the laws of complexation of cations of these metals, must draw the right conclusions. And such subtleties are in every experimental work. It stimulates creative mental activity of students, their ability to think critically.

It was the staff of the Department of Medical and Bioorganic Chemistry who started the brain-ring, which was first held in 2014 in a generalizing lesson on bioorganic chemistry in groups with in-depth study of disciplines called "Learn Chemistry" [11]. And then, it was included in the program of the traditional annual Festival of Youth Science KhNMU "Medicine of the Third Millennium" brain-ring of students and young scientists "Medicine without Borders". It is also important that during the experiments, students acquire the ability to use the accessories and devices that are used. Critical approach on the part of performing students requires the processing of experimental data and the ability to correctly formulate conclusions. The formation of all these skills and abilities are the first steps in preparing students for scientific work. Lessons are usually dialogical in nature, which radically changes the interaction between teacher and student. The teacher does not act as a carrier of information. It creates conditions for the manifestation of initiative on the part of students, who with such a method of organizing the educational process become full

and active participants [11]. This approach encourages students to a deeper and more complete study of the program material, to a wider application of basic knowledge acquired in high school. Often students of these groups are not satisfied with the information received (lectures, work with textbooks), and additionally study the scientific literature. Therefore, the teacher in such groups must have the latest and most up-to-date data on the subject of study. In such groups we try, as much as possible, to diversify the forms of classes. Thus, the defense of the course work on the chemistry of nutrients is held as a mini-conference, and when performing laboratory work on the analysis of gastric juice we use the method of small groups – it brings the spirit of competition, while working a group of experts from among students. teacher. The end result is comprehensive. Of course, conducting such classes in groups requires creativity, high professionalism and sufficient experience on the part of the teacher. The collective activity of all students of the group, when everyone contributes to the work, is accompanied by the exchange of knowledge, ideas, promotes the development of cognitive activity, brings elements of creativity, cooperation, collaboration. Thus, the staff of the Department of Medical and Bioorganic Chemistry works not only to find ways to intensify the assimilation of theoretical material from the disciplines being studied, practice practical skills at the research level, especially those used in clinical analysis, but also to interest students in scientific work.

Conclusions. SRW is an important factor for student to increase the professional training of future specialists in higher medical education, primarily because it provides individualization of training, allows for personal-oriented learning, allows to implement personality-oriented learning, expands the knowledge, skills and abilities of students, promotes activity, initiative, curiosity, develops creative thinking, encourages independent search. SRW is of exceptional importance for the development of all strategic areas of the university: providing quality training, deepening international educational and scientific activities, improving the system of training and certification of scientific and scientific-pedagogical staff, development of innovation. The development and effective implementation of RSW in the HEI is a

necessary condition for increasing its competitiveness in the international scientific and educational space. The RSW of students of the circle strengthens creative and active abilities in the educational process, is a powerful tool for selective selection of personnel for the training of young scientists, preservation and development of scientific schools. Students who have experience in student research work, show more creative thinking, usually achieve remarkable success in their future careers. This indicates a high level of training of future professionals. Participation of students in the SSC helps to gain such professionally significant qualities as discipline, clarity, responsibility, skills to work individually and in collective, group forms of activity, which allows students to better adapt to professional activities, feel the constant need to improve professional skills and deepen theoretical knowledge. Thus, the SSS is focused on the professional development of the future medical specialist, which is based on the scientific achievements of the student, taking into account his abilities, interests and motives. This is a powerful and reliable tool for selecting young researchers for the medical university, and the task of future generations of students and teachers – to keep high the level of proper research and teaching work.

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