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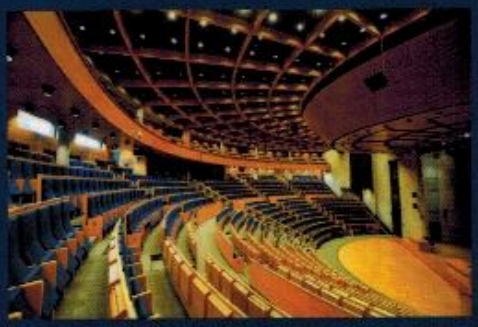
Creative Education: towards competences in a patient-oriented pharmacy education



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INTERDISCIPLINARY INTERGRATION OF CHEMISTRY KNOWLEDGE AS A FACTOR OF PROFESSIONAL COMPETENCE IN THE FUTURE MASTERS OF PHARMACY

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INTRODUCTION

Training specialists who can consciously use the potential of fundamental disciplines for systematic professional solutions is one of the ways to improve pharmaceutical education in Ukraine. Interdisciplinary integration, a new didactic concept of a comprehensive educational process in colleges and universities, can help to achieve this goal. Interdisciplinary, integrated requirements for training results, focused on the use of links between the disciplines of humanitarian, socio-economic, natural, scientific and professional training, are the basis of the competence approach in higher education.

The leading principles for the implementation of an integrative approach in teaching chemistry disciplines are:

– the principle of interdisciplinary integration, which provides for a coordinated study of individual chemistry disciplines, when each discipline uses the knowledge of another discipline and prepares the students for successful mastering of the concepts of the next (consequent) discipline;

– the principle of unity of intra- and interdisciplinary integration of chemistry knowledge and methods of action, reflecting the obvious uniformity in the interpretation of the same chemistry concepts, laws, theories, etc. and the exclusion of their duplication during the study of various chemistry disciplines; systematization and generalization of the chemistry concepts;

– the principle of horizontal and vertical dynamics and coordination of students' cognitive activities, which determines the temporal coordination of individual educational chemistry disciplines, ensuring consistency and continuity of individual topics, when each discipline prepares the students for successful mastering of the concepts of the next (consequent) disciplines.

The purpose of this article is to analyze the theoretical basis for the integration in the process of training of pharmacists and possible introduction of integrated chemistry courses in the programs for the Masters of Pharmacy for the creation of their professional competencies.

MATERIALS AND METHODS

In order to accomplish these tasks, the curriculum for the training of specialists of the second (master) higher education level, Discipline 22 "Healthcare", at higher educational institutions of the Ministry of Health of Ukraine for the specialty 226 "Pharmacy, Industrial Pharmacy", qualification "Master of Pharmacy", approved on July 26, 2016, and curricula of chemistry disciplines for the students of Faculty of Pharmacy of Bogomolets National Medical University were analyzed. Four groups (156 students) of the 3rd year students of the Faculty of Pharmacy were tested during their classes at the department of Pharmaceutical, Biological and Toxicological Chemistry of Bogomolets National Medical University. The study methods included 40 A-format tests from the database of the license examination "KROK 1. Pharmacy". Students were given 40 minutes to complete the tests. Answers were evaluated according to the alternative form: "correct" or "incorrect" without calculating the percentage of errors. The subjects of the tests were related to the currently studied subjects of the disciplines.

RESULTS AND DISCUSSION

The analysis of the curricula for specialty "Pharmacy, Industrial Pharmacy" showed that, in Ukraine, chemistry disciplines constitute at least 68.0 % of medical and biological disciplines as part of the

natural science cycle. The students' knowledge generated by the cycle of chemistry disciplines shows complex subordination: in the 1st year students are study discipline "General and Inorganic Chemistry" (6 credits: 110 classroom hours and 70 independent learning hours); in the 2nd year – "Physical and Colloid Chemistry" (4 credits: 90 and 30 hours), "Analytical Chemistry" (8 credits: 150 and 90 hours) and "Organic Chemistry" (8 credits: 150 and 90 hours); in the 2nd and 3rd year – "Biological Chemistry" (6 credits: 100 and 80 hours); during 3rd , 4th and 5th years – "Pharmaceutical Chemistry" (13 credits: 250 and 140 hours); in the 4th year – "Forensic Chemistry and Toxicology" (4 credits: 90 and 30 hours). Therefore, the organization of the integrated teaching of chemistry disciplines as part of the natural science cycle – "General and Inorganic Chemistry", "Analytical Chemistry", "Organic Chemistry", "Biological Chemistry"; disciplines as part of the professional science cycle – "Physical and Colloid Chemistry", "Pharmaceutical Chemistry", "Forensic Chemistry and Toxicology"; as well as selective disciplines – "Cosmetic Chemistry", "Theoretical foundations of synthesis", "Physical-chemical analysis in the Drug Discovery" may be an example of interdisciplinary integration in the training of pharmacists.

It is important to bear in mind that several chemistry disciplines, studied during different training courses, are involved in the formation of the same competence. Therefore, an interdisciplinary approach is implemented in inter-faculty student's scientific circles or seminars, which will allow to deepen and expand knowledge, skills and abilities in each subsequent discipline that forms this competence.

One of the factors of interdisciplinary integration are tests which, in their content, provide control of the basic knowledge obtained during the study of previous disciplines. The principle of "feedback", as a rule, consists in evaluating "baseline knowledge", which at best reflects residual knowledge in students. For example, the 3rd year students of the Faculty of Pharmacy were offered tests in "Organic Chemistry" (Semantic module 4: Carboxylic acids (Mono-, dicarboxylic acids). Carboxylic acid derivatives. Heterofunctional carboxylic acids. Carbonic acid derivatives. Sulfonic acid.), "Physical and Colloid Chemistry" (Semantic module 2: Kinetics of chemical reactions and catalysis. Semantic module 4: Dispersed systems and their properties. Semantic module 6: Physical chemistry of high molecular compounds) and "Analytical Chemistry" (Semantic module 3: Instrumental methods of analysis) during their classes in "Biological Chemistry" (Semantic module 2: Introduction to Biochemistry. Simple and complex proteins. Enzymes).

For the discipline of "Organic Chemistry", the students were offered 10 tests. The average percentage of successfully completed tests was 70.0 %. The most correctly performed tests ranged from 100.0 % to 40.0 %. 31 students did not reach the threshold of 60.0 %, which constituted 19.9 %. For the "Physical and Colloid Chemistry" (10 tests): the average percentage of successfully completed tests was 40.0 %; most correctly performed tests ranged from 90.0 % to 20.0 %. 61 students (39.1 %) did not reach the threshold of 60.0 %. For the "Analytical Chemistry" (10 tests) the average percentage of successfully completed tests was 50.0 %. The most correctly performed tests ranged from 80.0 % to 40.0 %. 64 students (41.0 %) did not reach the threshold of 60.0 %. For the "Biological Chemistry" (10 tests): The average percentage of successfully completed tests was 80.0 %. The most correctly performed tests ranged from 100.0 % to 60.0 %. 36 students (23.1 %) did not reach the threshold of 60.0 %.

CONCLUSIONS

Therefore, the results of the study are not unambiguous or definitive. Organization of the educational process requires further improvements in the content and structure of the educational materials of the chemistry disciplines included in the natural science and professional cycle, cooperation of the professors of different academic disciplines and the formation of chemistry knowledge and skills as a uniform and monolithic foundation of future professional and patient-oriented competencies in future pharmacists.

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