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Optimisation of the Content of the Academic Discipline «Fundamentals of Patent Studies, Intellectual Property and Implementation of Research Results» for the Training of Medical Researchers Based on a Comparative Analysis

Current trends and prospects in the scientific world in the field of medicine dictate the requirements for high-quality training of PhDs to ensure competitiveness in the global scientific arena, both for domestic science as a whole and for the individual achievements of scientists themselves. Among these requirements, one of the key ones is the acquisition, as a result of postgraduate study, of competencies related to the basics of legal protection, presentation, use and implementation of the results of scientific activity.

Objective — to substantiate the optimisation of an integrated compulsory course for medical PhD students on the basis of a comparative analysis of Ukrainian and international approaches to teaching patent studies, intellectual property and implementation of research results.

Materials and methods. Publications indexed in PubMed, higher education standards, syllabi and curricula of medical universities in Ukraine and leading scientific countries were analysed using comparative, structural-logical and content analysis.

Results and discussion. It has been established that in Ukraine a theoretically oriented model of teaching the fundamentals of patent studies, intellectual property and the implementation of research results predominates. This model ensures the stability of basic knowledge but limits the development of practical competencies and innovative thinking. A strong advantage of foreign educational programs is their substantially higher level of practical orientation, the integration of interdisciplinary approaches, the active use of simulations and project-based learning, as well as cooperation with institutions responsible for knowledge commercialisation, systemic interaction of higher medical education institutions with technology transfer structures, along with the involvement of learners in patenting processes, intellectual property management, creation of startups and participation in real innovation projects.

Based on the comparative analysis results, an updated structure of the discipline «Fundamentals of Patent Studies, Intellectual Property, and Implementation of Research Results» (3 ECTS credits) has been developed. It includes three content modules — «Fundamentals of Patent Studies and Copyright», «Patent-Information Search and Scientific Publications» and «Presentation and Implementation of Research Results» — as well as an expanded range of forms of independent and individual work that are practically oriented.

Conclusions. The proposed model ensures a shift in emphasis from passive theoretical acquisition to the development of applied skills that correspond to modern requirements of the innovation ecosystem, strengthens the practical orientation of PhD training and enhances the competitiveness of Ukrainian medical researchers.

Keywords

Intellectual property, patent studies, implementation of scientific research results, PhD training, medical education, technology transfer, research commercialisation.

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Contemporary trends and prospects of the global scientific community in the field of medicine [10, 12, 16] impose specific requirements on the quality of training of Doctors of Philosophy (PhD) in order to ensure the competitiveness of Ukrainian science on the international arena, both at the level of national output and at the level of individual researchers. Among these requirements, a key role is played by the acquisition during doctoral studies of competencies related to the fundamentals of legal protection, presentation, use and implementation of the results of scientific activity. This, in turn, determines the critical importance of teaching the discipline «Fundamentals of Patent Studies, Intellectual Property and Implementation of Research Results» to students of the third (educational and scientific) level of higher medical education.

The quality and completeness of the knowledge and skills gained as a result of studying this discipline determine not only how research results will be presented to the scientific and practical medical community and protected through patenting in the scientific world, but also how the final outcome of scientific work will be converted into an actual medical product or service that is visible on the global market and genuinely competitive. High-quality training of students at the third (educational and scientific) level of higher medical education is therefore crucial for increasing the quality, competitiveness and adaptability of Ukrainian medical science to contemporary challenges such as globalisation and innovation-oriented development. This training should include flexible, modern approaches to teaching the fundamentals of patent studies, intellectual property and implementation of research results.

Given that Ukraine's current «scientific visibility» remains relatively low (in terms of the number of highly influential scientific articles, Hirsch index and citations, patent applications indexed in Scopus and a low position in the Global Innovation Index compared with highly developed leading countries) [11, 23], a comparative analysis of approaches to teaching the fundamentals of patent studies, intellectual property and implementation of research results in Ukraine and in leading scientific countries is justified. The goal of such an analysis is to identify the strengths and weaknesses of the domestic approach. The results obtained may make it possible to incorporate identified differences when developing course syllabi for disciplines related to patent studies, intellectual property and implementation of research results in the training of medical researchers. This will support modernisation and integration with global standards, as emphasised in educational development strategies [4], while preserving national identity.

Objective — to substantiate the optimisation of an integrated compulsory course for medical PhD students on the basis of a comparative analysis of Ukrainian and international approaches to teaching patent studies, intellectual property and implementation of research results.

Materials and methods

To achieve the aim, we conducted a search of articles in PubMed using the following key words: «intellectual property», «patent law», «technology transfer», «research commercialisation», «implementation of research findings», «medical postgraduate education», «doctoral education», «PhD training», «curriculum development», «international comparison», «innovation management in medicine», «health sciences education», «graduate medical education», «research-to-practice translation», «educational approaches». In addition, we analysed published higher education standards, course syllabi and curricula of Ukrainian and foreign universities, focusing on topic content, number of hours and practical skills covered.

Results and discussions

In Ukraine, the existing standards of higher education do not define a mandatory set of disciplines that ensure the acquisition of competencies required for the preparation and conduct of fundamental and applied scientific research in the field of medicine, nor do they regulate the mandatory status and scope of such courses. Consequently, in a number of medical universities, disciplines that cover knowledge of the fundamentals of patent studies, intellectual property and implementation of research results are offered as an independent, separate course, whereas in other institutions they are presented as several distinct disciplines, each of which partially covers this thematic area. Accordingly, the number of hours allocated to studying this content is variable, and the status of the course also differs: in some institutions it is compulsory, in others elective. Overall, the volume of educational material on patent studies and related topics during the training of PhD candidates in medical specialties usually amounts to about 60—90 hours (2—3 European Credit Transfer and Accumulation System (ECTS) credits) [1—3, 5, 8, 9]. In a number of medical universities, the discipline is presented as a separate, integral course covering the full range of basic topics such as patentability, copyright, utility models, trademarks/industrial designs, licensing, technology transfer etc., whereas other higher education institutions offer several elective courses (sometimes in combination with compulsory ones) that partially include information on these aspects [1—3, 5, 8, 9].

The analysis showed that, in general, the total number of hours allocated to the study of analogous disciplines in foreign educational institutions most often ranges between 20 and 90 hours and is also delivered in a modular format [22]. The status of related courses abroad is likewise variable; however, foreign practice usually combines short micro-courses, which selectively cover specific topics, with long-term basic (often longitudinal) disciplines, as well as practical projects with mentoring support [10]. This ensures that all students acquire at least a basic level of competencies.

A comparative analysis of teaching approaches revealed that in Ukraine the key emphasis is frequently placed on theoretical analysis: doctoral students study examples of patents from Ukrpatent, conduct basic patent searches and search for publications to perform literature reviews in national databases etc. The practical component is often limited to seminar discussions without the use of simulations or project-based work. This approach supports academic stability of knowledge but restricts the development of innovative skills.

In contrast, foreign approaches to teaching these disciplines are significantly more practice-oriented. Unlike many Ukrainian programs, where theoretical mastery of the material predominates, foreign universities structure instruction around the development of applied skills in research commercialisation, interaction with technology transfer offices (TTOs), participation in patenting activities and launching start-ups based on scientific discoveries. This model provides a deeper understanding of the real mechanisms of innovation implementation and forms in doctoral students not only academic but also entrepreneurial competencies. Several illustrative examples from different countries are presented below.

In leading U.S. universities, the practical component of technology transfer and the commercialisation of research innovations is integrated into the research environment through programs such as the U.S. National Science Foundation Innovation Corps (NSF I-Corps) and the I-Corps at National Institutes of Health (NIH). According to Schultz et al. (2022), participation of academic researchers in the I-Corps program facilitates the development of entrepreneurial competencies, enhances market engagement skills and increases readiness for the commercialisation of research outcomes, thereby strengthening the innovation ecosystem of universities [19]. Similarly, as demonstrated by Canaria, Portilla and Weingarten (2019), the I-Corps at NIH program provides research teams with practical training in business model development, technology hypothesis validation and interaction with potential users — key components in transforming biomedical innovations into viable products [18, 21].

In addition, biodesign courses in medical and engineering schools in the United States include separate modules on IP management, enabling students to work through real cases related to innovation activities [21].

A special role is played by the CITI Program, one of the leading programmes for training researchers and faculty in the field of technology transfer. Its theoretical modules cover issues of patentability, types of intellectual property, principles of TTO operations and legal aspects of agreements between universities and external partners. At the same time, the practical blocks involve modelling real situations, from drafting business plans to creating start-ups based on university research [13]. Thus, the American approach combines academic depth with applied orientation, making the learning process as close as possible to real conditions of scientific and innovation activity.

Supporting the same idea of integrating theory and practice, British universities emphasise flexible and accessible learning formats. In particular, at Imperial College London, doctoral students take an online course on the basics of intellectual property (1 ECTS credit) — «Intellectual Property (Online Course)» [15]. Within the same institution, the module «How Intellectual Property Rights (IPR) Can Impact Your Research» is offered, aimed at familiarising students with principles of IP protection, licensing of developments and creation of spin-out companies [15]. Such formats make it possible to rapidly develop basic IP competencies and immediately apply them in ongoing research activities.

In Germany, the integration of intellectual property issues into doctoral training has taken on a systematic character. For example, at TUM Graduate School (Munich), the topics of patent law and commercialisation are included in the «transferable skills» block for all doctoral candidates [21]. The programme offers specialised workshop-type courses that cover not only project management and scientific communication skills but also entrepreneurship and technology transfer [21]. This ensures that students acquire not only theoretical knowledge but also practical skills necessary for subsequent scientific or entrepreneurial activity.

The Canadian model is characterised by combining educational processes with ongoing practical support from university innovation offices. For example, McGill University has the McGill Office of Innovation + Partnerships, which provides researchers with detailed guides on patenting, licensing and filing patent disclosures and also supports the creation of spin-off companies [17]. The office further offers training courses and consulta-

tions to develop basic awareness in the field of intellectual property, taking into account the needs and specific areas of work of individual researchers. Thus, doctoral students can not only complete an appropriate course, but also receive individual support, turning the learning process into a continuous cycle of development of innovation competencies.

In summary, foreign approaches to teaching disciplines related to intellectual property and innovation are characterised by practical orientation and interdisciplinarity. In most countries, they are based on integrating theoretical knowledge with practical cases and mentoring by experts, as well as involving students in real projects [14]. Accordingly, IP competencies are viewed not in isolation but as part of broader «innovation-entrepreneurial» or biodesign training tracks. This model leads to doctoral students who not only master theoretical foundations but also acquire practical experience in commercialising their research, thereby significantly increasing their competitiveness in the global science and technology environment.

Thus, foreign courses demonstrate a dynamic, practice-oriented and interdisciplinary approach, whereas Ukrainian courses are more stable but less flexible and more limited in contemporary topics. This contrast creates an objective basis for optimising the content of the domestic discipline.

Updating Ukrainian topics is intended not only to modernise course content, but also to improve alignment with contemporary competence-based requirements. In particular, the integration of elements of global patent law, ethics of innovation, digital technologies (AI, Big Data) and commercialisation makes it possible to form competencies in students such as the ability to conduct original research with innovation potential, engage in interdisciplinary collaboration, use modern digital resources and present results in the international scientific arena.

Overall, the optimisation of the thematic structure of the Ukrainian discipline based on foreign experience is not only desirable, but also a necessary condition for improving the quality of PhD training. The incorporation of 30—40 % practice-oriented elements, the introduction of blended learning and thematic modules devoted to AI, technology transfer and ethical challenges of innovation will contribute to forming competitive specialists capable of effectively implementing research results in real medical practice.

Optimisation of the Content of the Academic Discipline «Fundamentals of Patent Studies, Intellectual Property and Implementation of Research Results» at Bukovinian State Medical University

In our view, taking into account the results of the analysis of international experience in teaching disciplines related to intellectual property, patent studies and technology transfer, it is appropriate to introduce into doctoral (PhD) programmes in medical specialties a unified, integral compulsory course «Fundamentals of Patent Studies, Intellectual Property and Implementation of Research Results». This approach provides systemic and logical consistency in the formation of professional competencies of future researchers — from understanding the theoretical foundations of intellectual property protection to mastering the practical mechanisms of patenting, licensing and commercialisation of research outcomes.

Our choice of an integral course model is driven by the need to avoid fragmentation of educational material, which often occurs when topics are distributed across several separate disciplines. An integrated approach enables doctoral students to understand the relationship between legal, patent and innovation-commercial aspects of scientific activity and provides a holistic vision of the process «from scientific idea to practical implementation». At the same time, within practical classes, we foresee updating and revising thematic plans in line with contemporary trends in the development of medical science and technology transfer. In particular, strengthening of the practical component is planned through case analysis, patent searches, development of commercialisation models and simulation of technology transfer agreements.

Furthermore, considering the positive experience of foreign universities, where short elective micro-courses (for example, in advanced patent law, biomedical commercialisation or licensing strategies) are actively used alongside compulsory courses, our university also plans to offer such optional modules to doctoral students. This will allow each student to deepen knowledge in areas that directly correspond to their research interests, while preserving the integrity and unity of the core curriculum.

Thus, combining a compulsory integrated course with voluntary elective micro-courses creates a balanced learning model that aligns with current international practices and, at the same time, ensures institutional coherence of the educational process. This approach contributes to the formation in students not only of basic knowledge in the field of intellectual property, but also of flexible competencies for individual academic and innovation activities.

A current trend in PhD programmes is to transform doctoral independent work from information-reproductive to analytic-project-based. Improvement consists not so much in increasing the volume as in changing the type of activity — from «study and describe» to «analyse, synthesise, create».

The inclusion of tasks such as patent landscape analysis, IP risk assessment, technology readiness

level (TRL) evaluation and preparation of a mini-pitch will promote the development of key PhD special (professional) competencies (SC) — SC01, SC02, SC05, SC06, SC07 and SC08 — ensuring the integration of the Ukrainian system with international standards [6, 7].

One of the key tasks in contemporary training of students at the third level of higher education is the formation of competencies related to legal protection of research results, their effective communication and implementation in practice. In this context, the discipline «Fundamentals of Patent Studies, Intellectual Property and Implementation of Research Results» occupies a special place, as it integrates legal, scientific and technological knowledge into a single educational domain.

However, analysis of the previous structure of the similar programme [1, 20] that we used showed that the topics of practical and lecture classes require updating in light of the dynamics of innovation in medicine, trends in Open Science, digitalisation of scientific communication and transformation of mechanisms of intellectual property protection. In particular, the previous topics of the discipline were largely general in nature and did not reflect the specificity of modern biomedical research.

For example, in the Content Module that regarded Innovation Process and Innovation Activity of a Researcher. Protectability of the Results of One's Own Scientific Research, considerable attention was devoted to describing the general stages of the innovation process, whereas issues of practical implementation of IP rights, criteria of patentability, international aspects of filing applications and peculiarities of protecting the results of medical research were insufficiently covered. By contrast, the revised content of this module provides for extended study of the fundamentals of patent studies, in-depth analysis of objects of intellectual property in the biomedical sphere and practical development of the algorithm for obtaining a patent in Ukraine. The addition of the topic «International Patent Systems (PCT, EPO)» makes it possible to form in students a holistic understanding of the global context of legal protection of innovations, thereby strengthening their competence to work in the international scientific space.

The Content Module that in the previous version focused on formats for presenting research results, which was important but limited opportunities to develop skills in working with information resources and analytical databases in the optimised version shifts emphasis toward patent information retrieval, analysis of scientometric databases (Scopus, Web of Science, PubMed) and the formation of a culture of academic integrity. This transformation allows not only familiarisation of students with methods of visualising results, but also training them to work with data necessary for patent research and for assessing the novelty and competitiveness of their own scientific developments. In addition, inclusion of a topic on preparing scientific publications in domestic and international journals promotes the development of practical skills in publication activity in accordance with international standards.

The third Content Module covered issues of implementing results into healthcare practice and preparing scientific articles. However, the previous structure lacked topics on technology transfer, innovation commercialisation and the relationship between academic and clinical practice. The improved version of the module reflects current trends in translational medicine and is supplemented with topics devoted to mechanisms of implementation, licensing, creation of start-ups and spin-off companies based on universities. This contributes to developing in students the ability to transform research results into real products and technologies that can be used in the healthcare system.

Below is the updated content of the academic discipline «Fundamentals of Patent Studies, Intellectual Property and Implementation of Research Results» of Bukovinian State Medical University (3 ECTS credits).

Content Module 1. Fundamentals of Patent Studies and Copyright

Specific Learning Objectives:

- To familiarise students with the key concepts of intellectual property and the specifics of IP objects in biomedical research.
- To develop knowledge of patentability criteria and the legal protection of medical innovations.
- To ensure understanding of national and international patenting procedures, including application preparation, examination and patent registration.
- To develop practical skills in working with patent documents and examples derived from medical practice.

Topic 1. The innovation process in medicine: essence, main stages of development, key stakeholders and the role of the researcher in creating and implementing scientific developments in healthcare.

Topic 2. Intellectual property objects in biomedical research: inventions, utility models, industrial designs and copyrights; specifics of their legal protection in the scientific and medical domain.

Topic 3. Patentability of medical developments: criteria of novelty, inventive step and industrial applicability; analysis of examples from national and international practice.

Topic 4. Patent acquisition procedure in Ukraine: preparation and filing of the application, examina-

tion process, registration and issuance of the protection document.

Topic 5. International patent systems: specifics of filing applications through the PCT system, the European Patent Office and other international mechanisms for the protection of intellectual property rights.

Content Module 2. Patent Information Search and Scientific Publications

Specific Learning Objectives:

- To familiarise students with methods of patent information search and major international databases (WIPO, Espacenet, Google Patents).
- To develop competence in using scientometric resources (Scopus, Web of Science, PubMed) for analysing scientific productivity and searching for relevant information.
- To provide knowledge on legal and ethical aspects of copyright in scientific publications, including issues of plagiarism and academic integrity.
- To develop practical skills in writing and preparing manuscripts for national and international scientific journals, in accordance with contemporary requirements for structure, formatting, and peer review.

Topic 6. Patent information search: methodology and tools for working with national databases (Ukrpatent Database, «Database of Applications and Patents of Ukraine for Inventions» and «Database of Industrial Designs of Ukraine») and international databases (WIPO, Espacenet, Google Patents); analysis of retrieved results.

Topic 7. Scientometric databases (Scopus, Web of Science, PubMed) and their importance for the modern medical researcher: searching for scientific information, evaluating citation metrics, impact indicators.

Topic 8. Copyright in scientific publications: legal and ethical aspects, issues of academic integrity, avoiding plagiarism in medical research.

Topic 9. Preparing a scientific article for a national professional journal: structure of a research paper, main formatting requirements, peer-review procedures.

Topic 10. Writing articles for international peer-reviewed journals: specifics of manuscript preparation, publishers' requirements, open access principles and their significance for medical science.

Content Module 3. Presentation and Implementation of Research Results

Specific Learning Objectives:

- To familiarise students with methods for preparing oral, poster and multimedia scientific presentations aimed at effective scientific communication.
- To develop understanding of various mechanisms for implementing research results into healthcare practice (information leaflets, methodological guidelines, treatment standards).
- To provide knowledge of the fundamentals of technology transfer in medicine, including licensing, creation of start-ups and spin-off companies.
- To develop the ability to design strategies for commercialisation of research results through grant funding, venture investments and collaboration with pharmaceutical companies.

Topic 11. Methods of preparing an oral scientific report: logic of presenting material, principles of data visualisation, and communication with a scientific audience.

Topic 12. Poster and multimedia presentations: requirements for structure, design and scientific content; examples of formatting for international medical conferences.

Topic 13. Types of implementation of scientific results in healthcare practice: information leaflets, methodological guidelines, treatment standards and their regulatory framework.

Topic 14. Technology transfer in medicine: mechanisms of licensing, creation of start-ups and spin-off companies based on biomedical research outcomes.

Topic 15. Strategies for commercialisation of research results in medical science: opportunities for attracting grant funding, venture capital investments and partnerships with pharmaceutical companies.

Optimisation of Forms of Independent Work of Doctoral Students within the Discipline «Fundamentals of Patent Studies, Intellectual Property and Implementation of Research Results»

In accordance with contemporary approaches to training students at the third level of higher education, independent work should acquire an analytical and research-oriented character, aimed not only at reproducing existing information, but also at developing the ability to integrate, generalise and practically apply knowledge in the field of intellectual property. Optimisation of forms of independent work within the discipline implies not an increase in its volume, but a shift in emphasis toward developing innovation-oriented thinking, patent-analytical culture and the ability to present research results in an applied context.

One example of improvement is the updating of approaches to patent search. Traditionally, doctoral students were asked to analyse at least five analogous patents related to their research topic in the databases of Ukrpatent, Espacenet or WIPO. To increase the effectiveness of this task, it is appropriate to supplement it with a comparative analysis of patent strategies in different jurisdictions (Ukraine, EU, US), as well as with visualisation of

search results in the form of a «patent landscape map» or «IP heat map» using open tools (Lens.org, WIPO INSPIRE). Such a task will facilitate the transition from a reproductive to an analytical level of knowledge acquisition and support the development of competencies SC01, SC06 and SC07 related to the ability to perform systematic analysis of information in the field of intellectual property.

An equally important component is the bibliographic review on the topic of the dissertation research. Traditionally, this task involved summarising publications from scientometric databases (Scopus, PubMed etc.). Under current conditions, it is appropriate to expand this assignment by creating a scientometric profile of the topic using software such as VOSviewer or Bibliometrix, which makes it possible to identify key scientific areas, leading authors, citation indicators and research gaps over the past five years. To enhance the academic mobility of students, it is also useful to prepare a short executive summary in English. This approach transforms the review into an analytical mini-review format that may serve as a basis for a future publication.

Another direction of optimisation is the preparation of a poster or multimedia presentation based on the student's own research for a scientific conference. To deepen interdisciplinary links and focus on practical implementation of results, it is advisable to include in the poster structure a section «Intellectual Property/Innovation Potential», which reflects the patentability or innovation potential of the presented results. Carrying out this task in English contributes to the development of scientific communication skills and integration into the international academic space. An additional element may be the organisation of short mini-pitch competitions, forming skills in concise and persuasive presentation of scientific ideas from the standpoint of their practical value.

In summary, the above directions of optimisation make it possible to transform independent work of doctoral students from a purely educational component into a full-fledged tool for developing research and communication competencies. This ensures integration of the educational process with practices of research commercialisation, formation of a culture of intellectual property and preparation of young scientists for effective implementation of their research results in scientific and innovation environments.

Proposed New Forms of Individual Work of Dotoral Students

Further optimisation of the discipline «Fundamentals of Patent Studies, Intellectual Property and Implementation of Research Results» implies not only updating the content of lecture and practical topics, but also expanding the range of individual work aimed at developing integral, general and specific competencies in line with higher education standards. Shifting emphasis toward research, communication and digital components of the educational process will promote deeper engagement of doctoral students with practical aspects of intellectual property and innovation management in medicine.

Among contemporary forms of individual work to be incorporated into the curriculum, the following can be highlighted:

- Development of an individual intellectual property map (IP Portfolio Map) for the dissertation topic. This task involves identifying potentially protectable objects, their patent classification and possible directions of licensing or technology transfer. Such an approach forms in students a systemic view of the process of commercialising research results and contributes to the development of competencies SC02, SC05 and SC07.
- Preparation of a concise innovation profile of the research (Research Innovation Brief) in the form of a two-page analytical report. Its structure may include a description of scientific novelty, assessment of the competitive environment, possible application areas, a tentative patent strategy and elements of SWOT analysis. This assignment deepens understanding of the relationship between scientific results and their practical value and develops the ability to succinctly formulate ideas in the context of international scientific communication (SC01, SC03, SC05).
- Creation of an electronic research data management file (Research Data Management File) using open digital platforms (e.g. Zenodo, Figshare or OSF). This task supports the development of skills in research data management, familiarises students with the FAIR (Findable, Accessible, Interoperable, Reusable) principles and promotes academic integrity. Implementation of this form of work aligns with current European trends in open science and fosters competencies SC06 and general competencies (GC) GC04.
- Preparation of a publication or conference abstract in preprint format in accordance with the requirements of international open platforms (Research Square, medRxiv, arXiv). This assignment models real scientific communication, familiarises students with the requirements of international journals and supports the development of academic writing skills, English-language scientific communication and dissemination of research results (SC03, SC07, GC02).
- Development of a short video presentation «Research Pitch» (up to 3 minutes) in English

or in the state language. This is a contemporary form of representing research results as digital storytelling, widely used by leading universities to develop self-presentation and research advocacy skills. The assignment combines creative and communication approaches, developing competencies SC03, SC08 and GC03.

The introduction of these forms of individual work not only diversifies the learning process but also supports the formation in students of practice-oriented skills in patent analysis, academic writing, digital literacy and strategic thinking. Thus, the discipline acquires the features of an integrated educational-research module in which the educational process is organically combined with preparing students for real scientific and innovation activities.

Conclusions

The comparative analysis revealed marked differences between Ukrainian and international approaches to teaching patent studies, intellectual property and research implementation within medical PhD training. Ukrainian programmes tend to demonstrate variability in course status and workload, fragmented content and a predominantly theoretical focus, whereas foreign programmes consistently integrate practice-oriented, interdisciplinary components, technology transfer mechanisms and mentoring into doctoral education.

Based on these findings, the introduction of a unified compulsory course, «Fundamentals of Patent Studies, Intellectual Property and Implementation of Research Results», for medical PhD programmes at Bukovinian State Medical University is substantiated. This integrated model eliminates content fragmentation, ensures a coherent progression from scientific idea to practical implementation and aligns doctoral training with international competence-based standards. The revised thematic structure combines theoretical foundations with practical tools for searching, analysing, publishing and implementing research outcomes, thereby strengthening interdisciplinarity and fostering research autonomy.

The updated discipline places particular emphasis on applied learning and competence development. Modernised independent and individual tasks — such as patent landscape analysis, technology readiness level assessment, scientometric profiling, preparation of innovation briefs and academic presentations — promote the development of research, digital, communication and strategic competencies essential for contemporary academic and innovation careers.

Overall, the optimised course functions as an integrated educational and research module that enhances the culture of intellectual property, improves the applicability and quality of doctoral research and increases the international competitiveness of graduates of Ukrainian medical PhD programmes.

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References

1. Буковинський державний медичний університет. Освітньо-наукова програма «Медицина», третій освітньо-науковий рівень, спеціальність 222 Медицина. Чернівці. https://www.bsmu.edu.ua/wp-content/uploads/2019/06/8_PhD-ONP-Mediczina-BDMU.pdf.
2. ДУ «Національний інститут терапії імені Л.Т. Малої» НАМН України. Проєкт освітньо-наукової програми «Медицина», PhD, третій рівень, спеціальність 222 Медицина. Харків; 2024. https://www.therapy.org.ua/files/ONPNIT2024.pdf.
3. Івано-Франківський національний медичний університет. Освітньо-наукова програма «Медицина», третій рівень (PhD), спеціальність 222 Медицина. ІвanoФранківськ. https://www.ifnmu.edu.ua/wp-content/uploads/2024/08/%D0%9E%D0%9D%D0%9F-%D0%9C%D0%B5%D0%B4%D0%B8%D1%86%D0%B8%D0%BD%D0%B0-2020-04.-2023.pdf.
4. Кабінет Міністрів України. Про схвалення Стратегії розвитку вищої освіти в Україні на 2022—2032 роки: розпорядження КМУ від 23.02.2022 № 286 р. https://zakon.rada.gov.ua/laws/show/286-2022-%D1%80/stru2.
5. Львівський національний медичний університет імені Данила Галицького. Освітньо-наукова програма «Медицина», третій освітньо-науковий рівень, спеціальність 222 Медицина. Львів; 2025 (проект). https://nauka.meduniv.lviv.ua/wp-content/uploads/onp-medytsyna-2023-25-12-23.pdf.
6. Міністерство освіти і науки України: Стандарт вищої освіти зі спеціальності 221 Стоматологія для третього (освітньо-наукового) рівня вищої освіти. Наказ № 1023 від 15.11.2022 р. https://mon.gov.ua/static-objects/mon/sites/1/vishcha-osvita/zatverdzeni%20standarty/2022/11/23/221-Stomatolohiya-do.filosofiyi.23.11.22.pdf.
7. Міністерство освіти і науки України: Стандарт вищої освіти зі спеціальності 228 Педіатрія для третього (освітньо-наукового) рівня вищої освіти. Наказ № 1539 від 29.10.2024 р. https://mon.gov.ua/static-objects/mon/sites/1/vishcha-osvita/zatverdzeni%20standarty/2024/30-10-2024/228-pediatriya-doktor-filosofiyi-1539-vid-29-10-2024.pdf.
8. Одеський національний медичний університет. Освітньо-наукова програма «Медицина», третій рівень, спеціальність 222 Медицина. Одеса. https://onmedu.edu.ua/wp-content/uploads/2025/05/ONP_Medicina_tretogo_rivnja_vishhoi_osviti_ONMedU_2025_1.pdf.
9. Тернопільський національний медичний університет імені І.Я. Горбачевського. Освітньо-наукова програма «Медиция», третій освітньо-науковий рівень, спеціальність 222 Медицина. Тернопіль. https://www.tdmu.edu.ua/wp-content/uploads/2022/11/ONP-Medytsyna-2022_merged_compressed.pdf.
10. Arias J, Scott KW, Zaldivar JR, et al. Innovation-Oriented Medical School Curricula: Review of the Literature. Cureus. 2021 Oct 5;13(10):e18498. doi: 10.7759/cureus.18498.

11. CASE Україна. Як там у науковців? [Internet]. Kyiv: CASE Україна; 2015 Dec 17. https://cost.ua/378-science-horiz/.
12. Challa KT, Sayed A, Acharya Y. Modern techniques of teaching and learning in medical education: a descriptive literature review. MedEdPublish (2016). 2021 Jan 21;10:18. doi: 10.15694/mep.2021.000018.1.
13. CITI Program. Technology Transfer and Intellectual Property Training [Internet]. https://techtransfer.syr.edu/innovators/technology-transfer-educational-program-citi/.
14. Huang S, Siah KW, Vasileva D, Chen S, Nelsen L, Lo AW. Life sciences intellectual property licensing at the Massachusetts Institute of Technology. Nat Biotechnol. 2021 Mar;39(3):293-301. doi: 10.1038/s41587-021-00843-5.
15. Intellectual Property Online Course (1 ECTS) for PhD students (Imperial College London) [Internet]. https://www.imperial.ac.uk/early-career-researcher-institute/learning-and-development/courses-by-programme/research-impact-and-knowledge-exchange/.
16. Majumder Md. Anwarul Azim, Haque Mainul, Razzaque Mohammed S. Editorial: Trends and challenges of medical education in the changing academic and public health environment of the 21st century. Front Commun. 2023;8. doi: 10.3389/fcomm.2023.1153764.
17. McGill Office of Innovation and Partnerships [Internet]. https://www.mcgill.ca/research/about/innovation.
18. Nearing K, Rainwater J, Neves S, et al. I-Corps@NCATS trains clinical and translational science teams to accelerate translation of research innovations into practice. J Clin Transl Sci. 2020 Dec 7;5(1):e66. doi: 10.1017/cts.2020.561. PMID: 33948285; PMCID: PMC8057475.
19. Schultz I, Blaho JA, Becker KH. The impact of the National Science Foundation's Innovation Corps (I-Corps) on academic innovation and entrepreneurship. Eur Phys J D At Mol Opt Phys. 2022;76(12):232. doi: 10.1140/epjd/s10053-022-00562-9. PMID: 36506839; PMCID: PMC9717574.
20. Todoriko LD, Pidverbetska OV, Pidverbetskyi OYa, Zorii NI, Toderika YaI. Presentation and implementation of the results of the own scientific research — a practical approach. Туберкульоз, легеневі хвороби, ВІЛ-інфекція.2021;4(47):21-26. doi: 10.30978/TB2021-4-21.
21. TUM Graduate School: Doctoral Seminar «Entrepreneurship & Technology Transfer in the Life Sciences» [Internet]. https://www.tum-venture-labs.de/offerings/doctoral-seminar-entrepreneurship-technology-transfer-in-the-life-sciences/.
22. TUM Graduate School**:** Workshop «Einführung in die Welt des Patentrechts — Schutz und Verwertung von Erfindungen» [Internet]. https://www.gs.tum.de/fileadmin/w00bik/www/_my_direct_uploads/TUM_Graduate_School_KursnewsletterNr23_2023.pdf.
23. World Intellectual Property Organization. Global Innovation Index 2025: Ukraine — ranking and analysis of Ukraine's innovation performance. [Internet]. https://www.wipo.int/edocs/gii-ranking/2025/ua.pdf.

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Оптимізація змісту навчальної дисципліни «Основи патентознавства, інтелектуальної власності та впровадження результатів наукового дослідження» для підготовки науковців медичної сфери за результатами порівняльного аналізу

Сучасні тренди та перспективи у сфері медицини визначають вимоги до якісної підготовки докторів філософії для забезпечення конкурентоспроможності на світовій науковій арені як вітчизняної науки загалом, так і доробків науковців. Однією з ключових вимог є набуття під час навчання в аспірантурі компетентностей щодо основ правової охорони, презентації, використання та впровадження результатів наукової діяльності.

Мета роботи — на підставі порівняльного аналізу вітчизняного та зарубіжного досвіду викладання дисциплін патентознавства, інтелектуальної власності та впровадження результатів наукових досліджень обґрунтувати оптимізацію змісту інтегрованої нормативної дисципліни для аспірантів медичного профілю.

Матеріали та методи. Проаналізовано публікації з бази даних PubMed, освітні стандарти, робочі програми й навчальні плани медичних закладів вищої освіти України та інших країн із застосуванням порівняльного, структурно-логічного та контент-аналізу.

Результати та обговорення. Установлено, що в Україні домінує теоретично орієнтована модель викладання основи патентознавства, інтелектуальної власності та впровадження результатів наукових досліджень, що забезпечує стабільність базових знань, але обмежує розвиток практичних компетентностей та інноваційного мислення. Перевагами зарубіжних освітніх програм є значно вищий рівень практичної спрямованості, інтеграція міждисциплінарних підходів, активне застосування симуляцій, проєктної роботи та співпраці з організаціями, які дозволяють комерціалізувати знання, системна взаємодія закладів вищої медичної освіти зі структурами трансферу технологій, залучення

здобувачів до процесів патентування, управління інтелектуальною власністю, створення стартапів та участі в реальних інноваційних проєктах.

На підставі результатів аналізу оновлено структуру дисципліни «Основи патентознавства, інтелектуальної власності та впровадження результатів наукових досліджень» (3 кредити Європейської кредитної трансферно-накопичувальної системи (ЄКТС)). До її складу входять три модулі —«Основи патентознавства й авторського права», «Патентно-інформаційний пошук і наукові публікації», «Презентація та впровадження результатів досліджень». Розширено спектр форм самостійної та індивідуальної роботи, які є практично-орієнтованими.

Висновки. Запропонована модель забезпечує перехід від пасивного засвоєння теорії до формування прикладних умінь, що відповідають сучасним вимогам інноваційної системи, підсилює практичну спрямованість PhD-підготовки й підвищує конкурентоспроможність українських медичних дослідників.

Ключові слова: інтелектуальна власність, патентознавство, впровадження результатів наукових досліджень, підготовка докторів філософії, медична освіта, трансфер технологій, комерціалізація досліджень.

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- Todoriko LD, Pidverbetska OV, Pidverbetskyi OYa, Shevchenko OS. Optimisation of the Content of the Academic Discipline «Fundamentals of Patent Studies, Intellectual Property and Implementation of Research Results» for the Training of Medical Researchers Based on a Comparative Analysis. Tuberculosis, Lung Diseases, HIV Infection (Ukraine). 2026;1:115-124. http://doi.org/10.30978/TB2026-1-115.