

REVIEW

**of the dissertation on the topic:
" DIGITAL AND E-HEALTH LITERACY IN THE TRAINING OF BULGARIAN
NURSES "**

of the PhD candidate: Nelly Diyanova Petrova

Lecturer at the Department of Medical Equipment, Electronic and Information
Technologies in Healthcare".

Faculty of Public Health , Medical University – Varna

for awarding the educational and scientific degree "Doctor"

Field of higher education: 7. Health Care and Sports

Professional field: 7.4. Healthcare Management

Doctoral Program: Public Health Management

Reviewer: Prof. Sonya Koleva Toncheva, PhD, DSc

Member of the Scientific Jury, according to Order No. 109-60/27.01.2026 of
The Rector of the Medical University "Prof. Dr. P. Stoyanov" - Varna

I. Details of the procedure

Nelly Diyanova Petrova was enrolled as a full-time PhD candidate for the acquisition of the educational and scientific degree "Doctor" in the field of higher education: 7. Health Care and Sports, professional field 7.4. Public Health, in the doctoral program Public Health Management, according to the Rector's Order No. R -109-513/01.12.2021. On the grounds of Art. 24, para. 6 and Art. 30, para. 3 of the Development of Academic Staff in the Republic of Bulgaria Act (DASRBA) and the Regulations on Academic Staff Development at the Medical University – Varna, after successfully passing the doctoral minimum and according to the readiness for public defense, **Neli Diyanova Petrova** was dismissed with the right for defense by Order No. P No. 109-60/27.01.2026 of the Rector of MU - Varna.

The dissertation was approved and proposed for public defense by the Extended Department Council of the Department of "Social Medicine and Health Care Organization" at the Faculty of Public Health of the Medical University - Varna on 10.12.2025.

II. Biographical data and career development of the doctoral student

Nelly Diyanova Petrova was born in 1984 in Varna. In 2007, she obtained a Bachelor's degree in Business Administration from the Varna Free University "Chernorizets Hrabar". Later, in 2009, she obtained the educational and qualification Master's degree in Public Health at the Medical University "Prof. Dr. Paraskev Stoyanov" - Varna. After successfully passing the state exam for the specialty in December 2015, she acquired the rights of a specialist in "Medical Informatics and Health Care Management", effective since 01.01.2016.

Neli Petrova's academic career began when she was appointed as a part-time assistant at the Medical University - Varna, Faculty of Public Health, Department of Social Medicine and Health Care Organization in the winter semester of the 2019-2020 academic year. Subsequently, after a successful competition in 2020, she was appointed as a full-time assistant at the Department of Medical Equipment, Electronic and Information Technologies in Health Care, Medical University - Varna. Since 01.12.2021, she has been enrolled in full-time doctoral program at the Department of Social Medicine and Health Care Organization.

Since 20.03.2025, she has been appointed as a lecturer in "Medical Informatics and Health Care Management" at the Department of "Medical Equipment, Electronic and Information Technologies in Healthcare" of the Faculty of Public Health at the Medical University - Varna. Lecturer Neli Petrova participates in the life of the department as part of a research project and provides course guidance for first-year students in "Biomedical Equipment and Technologies".

III. General characteristics of the dissertation work

The dissertation presented by **Neli Diyanova Petrova** was developed at the Department of Social Medicine and Health Care Organization, Faculty of Public Health at the Medical University - Varna. The dissertation is structured in three chapters and contains 129 pages - with references and without appendices (2 pages of introduction, 24 pages of overview, 6 pages of methodology, 71 pages of results and discussion, 4 pages of conclusions, implications and contributions, 13 pages of bibliography, 19 pages of appendices), 40 tables and 79 figures, 3 appendices have been presented.

Relevance and significance of the topic

The topic that Neli Petrova has chosen for her dissertation is significant and very relevant. It focuses on the ability of health professionals to interact with digital resources in a critical, ethical and effective manner. That is why the digital competence of medical professionals, and nurses in particular, is not only an operational characteristic, but a structural indicator of the systemic sustainability and functional adaptability of the health sector.

The relevance of the topic of this dissertation is determined by the fact that the subject of this study is nurses as a professional category, whose role in the process of digitalization of health services is strategically key, but often underestimated and neglected. The subject of the study is the digital competence of nurses, interpreted through the lens of six index structures: information literacy, digital creativity, communication collaboration, safety, problem solving and e-health literacy.

The topic of the dissertation is also relevant due to the fact that the author considers, in a broader sense, e-health literacy, as she believes that it allows people to search for and evaluate health information from electronic sources and to apply this knowledge in resolving health problems. Moreover, digitalization is advancing in the healthcare system, which has a multifaceted impact on the daily practice of nurses without claiming that technology will take over their role.

Literature review

The literature review is developed in 23 pages, structured in *Chapter I*.

In the literature review, Neli Petrova analyzes sources related to the topics developed in the dissertation and the author's concept developed subsequently. In separate sections, issues of

"The essence and importance of e-Health", "Digital and e-Health literacy of healthcare professionals", "Electronic health literacy of nurses", "Nursing informatics", "Impact of digital literacy on nursing students", etc. are discussed. The doctoral student has conducted a study of various sources targeting the problem of the role of the nurse, drawing attention to the need for nurses to have an acceptable level of literacy in the field of e-health in order to provide better health services and health education to the community. An important resource for healthcare is nurses to be aware of which carrier of health information is accessible to the majority of the population, as well as to possess skills that help their patients use e-health information and correct any misunderstanding of their diseases, which may result from misinterpretation of information collected from the Internet . The author points to the initiative of the International Council of Nurses , which aims for e-health to help provide quality care. The need to implement modern technologies, available in the field of information and communication technologies, in nursing education is emphasized, through a framework created as a guideline for the inclusion of health information technologies in core professional competencies. These competencies include the independent use of an electronic health record to document health assessment, diagnoses, interventions, outcomes and follow-up assessment of the patient's condition.

The review cites 133 sources out of the 248 listed in the bibliography, in which a highlighted *weakness is the lack of Bulgarian authors* . It is striking that the topics discussed in the review are *significantly fragmented*, with some of them being developed within less than half a page. Consolidating the headings would make this part of the dissertation more readable.

I recommend: the author publish the collected information in scientific journals as a review.

Study Design

Chapter II is entitled "Research Methodology ". In this part of the dissertation, based on the developed literature review, the aim is stated, 7 objectives and 4 hypotheses are formulated and the methods are provided. The author has applied various methods that guarantee the reliability of the obtained results. The general population includes **211 respondents**.

The study covers two groups, distributed as follows :

- Nurses selected through stratified random sampling from St. Marina University Hospital - Varna (n=101);
- Students majoring in "Nursing" at the Medical University "Prof. Dr. P. Stoyanov" - Varna (n=110).

Data collection was conducted during the period 10.02.2025 - 30.06.2025, in compliance with the ethical principles of voluntariness, anonymity and confidentiality. The survey questionnaires were completed independently by the respondents in a controlled environment. If we assume that the instruments for collecting primary sociological information are questionnaires, then they were developed for the purposes of the dissertation study. I acknowledge positively the summarized information listed in *Table I Analysis of existing models for assessing digital and e-Health literacy*.

I do not accept the presented limitations of the study , formulated by the author in the following way: " Nursing education in all medical universities in the country is conducted according to uniform state requirements it is expected that the attitudes of the students will

not differ significantly " and "... the study is focused on nurses working at St. Marina University Hospital - Varna, because it is one of the largest hospitals in Eastern Bulgaria .

The data were processed using appropriate statistical methods.

Weaknesses:

1. It is not stated how the random selection of respondents in the two groups was carried out;
2. The location (clinics) where the study was conducted is not specified;
3. The stages for carrying out the activities of the dissertation are not specified;
4. The instrument is referred to as a "questionnaire", which shows a certain lack of familiarity with sociological methods.

Results

In Chapter III, entitled “ EMPIRICAL ANALYSIS OF E-HEALTH SKILLS IN NURSING EDUCATION IN BULGARIA ” 4 sections are examined: 1. Research on the e-Health skills of nurses 2. Research on the e-Health skills of students studying to be nurses 3. Comparing the attitudes of nurses and students regarding summary indicators (indices) 4. Development and structure of a specialized training module to enhance critical e-Health and nursing information literacy .

The study achieves the set goal of clarifying the level of information and electronic literacy in the context of modern healthcare, where digital transformation requires medical professionals to be highly adaptable, have skills in critical selection and interpretation of health information, and actively participate in electronic processes related to patient health.

This dissertation is an empirical and theoretical study of e-literacy and e-health skills among two key groups in the health sector – nursing students and practicing nurses. The main research thesis that there are important differences in levels of digital competence, motivation to use electronic resources and confidence in working with health information online – is consistently confirmed through validated quantitative methods and objective interpretation of the collected data.

In essence, the dissertation presents results of the work carried out by the author. Based on the theoretically proven results, Nelly Petrova offers practical approaches for building digital competencies and skills for working in e-healthcare among nurses.

The analyses confirm the presence of a statistically significant digital inequality between younger respondents and those over 50 - students show higher digital creativity and information literacy, while nurses demonstrate higher scores in safety and ethical sensitivity.

The author develops an integrative conceptual model that brings together six key components of digital competence – information and data literacy, communication and collaboration, digital content, safety, problem solving, and e-health literacy.

The study found statistically significant differences between nurses and students in the following indices: Communication and Collaboration Index; Digital Content Creation Index; Problem Area Identification and Resolution Index; E-Health Literacy Index.

Based on the results of the study, Neli Petrova proposes a module titled “Nursing Informatics and Critical e-Health Literacy” to be included in the training of nurses (and/or other healthcare professionals). The module is structured to address the deficits identified by the study and the needs for practical integration of e-Health skills as specifically as possible, with a

duration of 15 teaching hours, as follows: 5 academic hours of lectures and 10 academic hours of seminars.

I accept the author's proposal that the module be offered as a facultative course for nursing students, and for practicing nurses, in the form of a postgraduate course.

Implications, recommendations and contributions are presented independently, not in a separate chapter of the dissertation. 13 conclusions have been drawn from the research, some of which are not significant and could be included either in chapter three or in the overview.

Evaluation of contributions

The dissertation represents a first of its kind study of the digital skills and e-Health literacy of nurses. The results of the scientific study, the formulated implications and recommendations outline contributions of *a scientific-theoretical* and *applied-practical nature*.

Contributions of a scientific and theoretical nature

1. The study offers a comprehensive theoretical framework for analyzing digital and e-Health literacy in the nursing profession, adapting international models (DigComp, eHealth Literacy Framework) to the Bulgarian context.
2. An integrative conceptual model has been developed that, for the first time, brings together six key components of digital competence – information and data literacy, communication and collaboration, digital content, safety, problem solving and e-health literacy. This expands scientific knowledge in the field of nursing informatics by demonstrating how age, professional experience and educational level influence the individual dimensions of digital skills.

Contributions of an applied - practical nature

1. A validated toolkit has been developed – an index system with high internal consistency – which can be used by higher education institutions, healthcare facilities and professional organizations to assess, monitor and plan the digital competencies of medical professionals.
2. Specific gaps in the preparation of nurses have been identified, especially in the areas of digital content, critical evaluation of health information, and technological creativity.
3. The study provides a reliable empirical basis for developing continuing education programs and strategic policies in the field of human resources in healthcare.
4. Of particular importance is the comparative analysis between students and practicing nurses – the first of its kind in Bulgaria – which highlights generational differences in digital literacy and assists in the formulation of adequate educational and institutional solutions.

Part of **the recommendations** made in the dissertation work are unclear and have an imperative nature, while others have not been formulated as a result of the research conducted. There is a lack of specificity and the addressees to whom the recommendations are addressed may not understand what is discussed.

The abstract reproduces the main points of the dissertation work and is presented in a volume of 66 pages.

The research portfolio includes a total of 2 scientific publications related to the dissertation work, which were published in 2025 at the "Varna Medical Forum", first online edition 14(2), with which Nelly Petrova formally fulfilled the requirements of the criteria for a PhD degree.

I recommend that the results of the study be published in specialized scientific journals in Bulgaria and abroad, so that they become available to a wider circle of practicing healthcare professionals.

Nelly Petrova fulfills the requirements for obtaining the educational and scientific degree "Doctor", through the developed dissertation, which can be considered a scientific work with theoretical and practical contributions.

I have critical comments: 1. Regarding the style and scientific writing of the dissertation 2. There are certain ambiguities and incompleteness in Chapter II. 3. There are no implications at the end of the individual chapters, which is why the PhD candidate has made many conclusions at the end of the dissertation. 4. Statistical analyses prevail, there is a lack of sufficient discussion of the results, with a focus on practical impacts. 5. The sample (101 employed nurses and 110 Nursing students) is with a focused location in Varna and does not provide grounds for drawing conclusions about "DIGITAL AND E-HEALTH LITERACY IN THE EDUCATION OF BULGARIAN NURSES ", which is the wording of the title of the dissertation.

The critical remarks made to some extent diminish the merits of the presented dissertation work.

In conclusion: Based on professional development, scientific and pedagogical achievements, and taking into account the criteria of the Act on the Development of Academic Staff in the Republic of Bulgaria, the Regulations thereto and the Regulations on the Development of Academic Staff at the Medical University "Prof. Dr. P. Stoyanov" - Varna, I give my positive vote and propose to the esteemed Scientific Jury the doctoral student **Neli Diyanova Petrova** to acquire the educational and qualification degree "Doctor" in "Public Health Management" for the needs of the Department of Medical Equipment, Electronic and Information Technologies in Health Care, Faculty of Public Health at the Medical University - Varna

20.01.2026

Заличено на основание чл. 5,
§1, б. „В“ от Регламент (ЕС)
2016/679

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