

STATEMENT

from Prof. Albena Kerekovska, MD, PhD

Department of Social Medicine and Organization of Healthcare
Faculty of Public Health
Medical University "Prof. Dr. Paraskev Stoyanov" – Varna

Regarding the doctoral thesis
For awarding the educational and scientific degree

PHILOSOPHY DOCTOR

In: 7. Healthcare and Sports – higher education area,
7.4. Public Health – professional field,
Public Health Management speciality

Of Eng. Deyan Grigorov Grancharov

Doctoral student in an independent form of study

Doctoral thesis on the subject of

EFFECTIVENESS AND PERSPECTIVES OF SIMULATION TECHNOLOGIES IN THE EDUCATION AND TRAINING OF HEALTH PROFESSIONAL STUDENTS

Research Supervisors:

Assoc. Prof. Natalia Vasilevna Usheva, DM, PhD
Prof. Eng. Kristina Stanimirova Bliznakova, PhD

Grounds for providing the statement: Order No. R-109-300 /07.06.2023 of the Rector of the Medical University "Prof. Dr. Paraskev Stoyanov" – Varna constituting the members of the Scientific Jury and the Minutes Summary No.1 of its first meeting on June 20th, 2023.

Details of the procedure

Eng. Deyan Grancharov has completed his studies in Public Health Management doctoral programme – professional field 7.4. Public Health, field of higher education 7. Healthcare and Sports. The doctoral student was enrolled for independent study at the Department of Social Medicine and Healthcare Organization by Order № P-109-9/16.01.2020 of the Rector of the Medical University – Varna. His thesis subject was “Effectiveness and perspectives of simulation technologies in the education and training of health specialities students”. Assoc. Prof. Natalia Usheva, MD, PhD, and Prof. Eng. Kristina Bliznakova, PhD, were appointed as research supervisors.

The doctoral student has successfully passed the PhD minimum standards criteria and has fulfilled all the activities stipulated in the individual study plan; he has earned the required credits and has received positive attestation marks. The PhD student was granted permission to defend the thesis by Order № R-109-300/07.06.2023 of the Rector of the Medical University – Varna. The Thesis Defence Procedure was launched by Order No. R-109-300/07.06.2023 of the Rector of Medical University – Varna. It is based on the decision of the Departmental Council of the Department of Social Medicine and Healthcare Organization (report No. 102-1220 of 18.05.2023) and the decision of the Faculty Council of the Faculty of Public Health (Protocol No. 206/23.05.2023).

The candidate has submitted all the necessary documentation for the procedure, complying with the requirements of the Development of the Academic Staff in the Republic of Bulgaria Act (DASRBA), the regulations for its application, and the Rules and Regulations of MU-Varna for academic staff development.

Brief biographical data about the author

Eng. Deyan Grancharov was born in 1973 in Varna. In 1997, he graduated from Technical University – Varna with a Master’s degree in Electronic Engineering and Microelectronics. In 2014, he obtained a second Master's in Healthcare Management at the Medical University – Varna.

Eng. Grancharov started his professional career in 1996 as a computer specialist. In the period 1997 – 2012, he held the position of General Manager in Dolphin-3 Company – Varna. Since 2012, he has been involved in the management of Medical University – Varna, holding the position of Assistant Rector.

In 2020 Eng. Grancharov was enrolled as an independent PhD student at the Department of Social Medicine and Healthcare Organization. The subject of his research thesis was: Effectiveness and perspectives of simulation technologies in the education and training of health specialties students. He is actively involved in 8 structural, educational and scientific projects.

The doctoral student has 3 scientific publications in Bulgarian research journals. He has very good foreign language skills – he is fluent in English and uses it in his professional and scientific activities.

Relevance and significance of the thesis

The thesis subject is highly relevant in present-day medical education – the application of simulation technologies in the training in medical specialities. The doctoral student's research interest was generated by the significance of the issue, its relevance and, concurrently, the lack of sufficient research in our country.

This is the first in-depth scientific study of the effectiveness of simulation-based training in medical schools in the country, as well as limitations to its extensive application and prospects.

The survey among different categories of respondents – students, lecturers and experts, contributes to fully and completely addressing the problem. The results have great practical significance for developing and advancing the application of modern simulation technologies, enhancing the efficiency in training medical students and postgraduates in Bulgaria, which is essential for their advanced practical training.

Thesis structure and contents

The thesis contains 189 pages and is illustrated with 15 tables and 6 figures. Its structure is logical and balanced and includes: Introduction; Literature Review; Aim, Tasks and Working Hypotheses; Materials and Methods; Results and Discussion; Conclusions; Contributions; Bibliography; and eight Appendices. There is a list of abbreviations at the beginning and a list of related publications at the end of the thesis.

The literature sources are accurately presented in the bibliographical reference. Two hundred thirty-two references are cited, of which 2 in Cyrillic and 230 in Latin. More than 90% of the references are from the last 5 years and illustrate the author's outstanding research awareness and up-to-date knowledge of the problem under study.

The literature review is focused, thorough and well-structured. It demonstrates a comprehensive and up-to-date knowledge of the doctoral student, his ability to summarise, systematise, and bring out significant issues, to analyse and decipher the scientific literature in the area of research.

A historical overview of the development of simulation training in medical disciplines worldwide is presented. The available information in the scientific literature on the characteristics of simulation technologies applied in medical education is summarised. The principal modern methods of simulation technologies and their specific application in the various medical disciplines are presented. Quality and effectiveness of modern simulation technologies compared to traditional training programs are particularly highlighted. The available simulation centres in the medical universities in the country are presented, and the training conducted in them is compared.

The lack of sufficient research on the application of simulation technologies in medical education and training in Bulgaria, emphasised at the end of the literature review, validates the research interest and the value of the scientific work.

The aim of the scholarly study is clearly and explicitly defined: *To analyse the application, effectiveness and perspectives of simulation technologies in the education and training of health professional students.*

Five tasks aimed at achieving the main goal are outlined. They are logically coherent and cover the subject in full.

Three working hypotheses have been formulated and correspond to the set tasks.

The research methodology is presented in detail and includes:

- Documentary method – analysis of scientific literature and regulatory sources;
- Quantitative sociological method (direct individual survey) among Bulgarian and English-speaking students in Medicine (5th year) and Dental Medicine (3rd year) at MU-Varna and among lecturers of obstetrics and gynaecology at MU-Varna;
- Experimental method – to evaluate the effectiveness of simulation-based training with a maternal-fetal simulator for 4th-year medical students in their childbirth and newborn care management training.
- Qualitative method for expert evaluation of the perspectives and limitations of simulation-based training (SBT) among representatives of different establishments involved in the development, introduction and implementation of SBT in medical educational institutions (simulation technology manufacturers, administrative managers and staff involved in the provision and support of simulation technology and lecturers applying SBT).

The research toolkit is presented. The questionnaires for students and faculty and the qualitative survey questionnaires for experts were developed for the purposes of the research by the doctoral student.

Appropriate statistical methods were applied to ensure the validity and reliability of the results.

An excellent level of proficiency in the methodology for conducting a scientific study is demonstrated at every stage of the study,

Results

The outcomes of the author's research are presented comprehensively in several parts and are well structured according to the tasks. The discussion compares the findings with the results of similar studies by foreign and Bulgarian authors.

The results show awareness and willingness on the part of students and lecturers to actively participate in simulation-based training. More than half of the students (54.5%) expressed the opinion that the seminar sessions with SBT are not sufficiently present in their curriculum.

The essential advantages of simulation technologies, highlighted by the different categories of respondents – students, lecturers and experts, are as follows: efficiency, the possibility of working independently in a realistic setting, repeated practical exercises and consolidation of the acquired knowledge and skills; patient safety; increasing one's understanding, experience and security; evaluating the attained results of training objectively; generating scenarios that are as near to reality as possible; recreating management protocols, especially for emergency conditions in a safe, placid and controlled environment; practising a sequence of actions and different clinical scenarios; unrestricted by the availability of a pertinent clinical case; unhindered by ethical considerations, etc.

A valuable result is the demonstrated effectiveness of simulation technologies in training medical students by conducting an experimental study on "management of childbirth" and "immediate care of the newborn". The experimental group underwent a pre-training session on the simulator. There was no prior training on the simulator for the control group.

The results of the qualitative study among different categories of experts prove especially valuable. It aimed to identify the main barriers preventing the introduction and extensive application of simulated training in medical education in our country. The most critical of them are non-adapted academy curricula; shortage of skilled lecturers across disciplines who are familiar with all the possibilities of specific simulation technologies; regulatory constraints; high cost; lack of or insufficient space to locate a simulation centre or equipment in the relevant premises; lecturers' insufficient motivation and work overload; inadequate amount of high-end simulators or suitable simulators for the relevant clinical discipline, etc.

The recommendations of the different groups of respondents are essential for the development and advancement of simulation-based training in the medical universities in the country. The main recommendations include the following: training in smaller groups; increasing the number of practical sessions with simulation technologies; increasing the number of simulators; increasing the number of assistant-professors conducting practical sessions with simulation-based technologies as well as the number of lecturers presenting more clinical cases during the exercises; evaluating all stages of the simulation (hazardous environment, patient status); more training hours for performing manipulations; incorporating actors in clinical scenarios; additional training of the lecturers on developing simulation tasks/scenarios.

Essential are the experts' proposals for mandatory regulation of the use of simulation technologies in medical education. According to them, this should be incorporated into the Unified state system of requirements that includes a foreseen curriculum, credits and disciplines. Simulation-based training should be embedded in the requirements for medical education. It is requisite to supply institutional backing for the advancement of simulation training through the construction and equipment of simulation centres, the purchase and maintenance of equipment, securing an ample amount of competent and motivated staff, and additional financial incentives for lecturers working with simulation technologies. Investing sufficient time and effort in self-schooling and re-enacting situational tasks and scenarios, as well as developing an appropriate, flexible and adaptive methodology for tutoring and assessing students, are measures indicated by the respondents as necessary for successfully applying simulation-based training in medical education.

Conclusions

There are 11 conclusions that are clearly formulated and logically follow the research results.

The characteristics of simulation-based training in medical disciplines are confirmed – high quality, significant efficiency, cost-effectiveness, reliability, potential options and patient safety. The SBT methods are considered a well-established component for both medical students and postgraduate students.

The effectiveness and potential of SBT in medical schools across the country is an understudied issue.

The students understand and appreciate the benefits of simulation technologies. They are satisfied with using simulators during training to recreate different clinical conditions. Conducting training with the application of simulation technologies leads to higher success rates and better skills.

The insufficient application of simulation technologies during practical sessions is highlighted, as well as the need to increase the number and improve access to simulators, especially for dental students.

The findings on the primary impediments to broader utilisation of simulation technologies in the education of health professional students are of particular practical benefit: unadapted curriculum, insufficient number of qualified and motivated faculty in different specialities, large number of students in groups; high costs for procuring and maintaining STs relative to the limited financial resources of educational institutions; insufficient space area to house a simulation centre or equipment in the relevant primary units.

Options for the advancement of simulation technology and its extensive application in the training of medical students are outlined: the adoption of a regulatory framework for mandatory use of STs in the training of students in different medical disciplines; institutional support through the provision of equipment and a sufficient number of qualified and motivated staff; the development of an adaptive methodology for training, assessing and certifying the knowledge and skills acquired.

Thesis contributions

The contributions of this thesis are predominantly original – of theoretical-cognitive and practical-applied importance.

An in-depth historical review of the development and application of simulation technologies for training students of different medical disciplines is made.

For the first time in our country, the effectiveness and perspectives of using modern simulation technologies in the training of clinical medicine students and dentistry students are studied. The first in the country experimental study was conducted to evaluate the effectiveness of simulation-based training of students in Obstetrics and Gynaecology. For the first time, the attitudes and experiences of lecturers on applying simulation technologies in the training of medical and dentistry students were surveyed. Obstetrics and Gynaecology students' and lecturers' knowledge, subjective experience and exposure when working with simulation technologies are analysed.

The results of the qualitative expert analysis revealing the impediments to the extensive application of simulation technologies for training health professional students in Bulgaria present an original contribution with considerable potential for practical implementation. The overall analysis of accumulated data facilitates the generation of recommendations for the relevant institutions to introduce routine and effective training of medical students in Bulgaria.

Thesis-related publications

The doctoral student has submitted three full-text publications in Bulgarian journals.

Evaluation of the thesis summary

The thesis summary has been prepared as required and fully reflects the content of the thesis. It is developed in 55 pages, well-illustrated with highly informative figures and tables. It is accompanied by a list of thesis-related publications.

Conclusion

Eng. Deyan Grigorov Grancharov's thesis on the *Effectiveness and perspectives of simulation technologies in the education and training of health specialities students* is comprehensive and up-to-date academic work. It is well structured, with clearly defined aims and tasks. The research design has been suitably selected. The methodology is complex and skilfully implemented. The results are presented correctly and comprehensively. The conclusions are explicitly stated and constitute the basis of the thesis contributions. The contributions are primarily original and have the potential to be practically applied. The thesis exhibits the author's in-depth theoretical knowledge in the scientific field and the ability to conduct scientific research independently.

The thesis fully meets the requirements of the Development of the Academic Staff in the Republic of Bulgaria Act, its implementation rules, and the relevant Rules and Regulations of MU-Varna for academic staff development for awarding the educational and scientific degree "Philosophy Doctor".

The research deals with a highly relevant yet insufficiently studied problem in Bulgaria. It advances the application and increased efficacy of modern simulation technologies in the health professional students in Bulgaria, a prerequisite for their better practical training.

The relevant subject matter, the applied complex methodology, the obtained results, the drawn conclusions, the contributions of a primarily original and applied nature and all the mentioned merits of the scientific work give me a compelling reason to render a favourable assessment of the thesis. In view of the above, I strongly support and recommend to the esteemed members of the Scientific Jury to award Eng. Deyan Grigorov Grancharov with the educational and scientific degree "Philosophy Doctor" in Public Health Management, professional field 7.4 Public Health.

21/08/2023

Reviewer:

Prof. Albena Kerekovska, MD, PhD

