

REVIEW

by Assoc. Prof. Nevyana Georgieva Feschieva, MD

of the dissertation

of Eng. Deyan Grigorov Grncharov

on the topic:

"Effectiveness and prospects of simulation technologies in the education of students of health specialties"

Scientific supervisors:

Assoc. Prof. Natalia Usheva, MD

Assoc. Prof. Eng. Kristina Bliznakova, doctor

By order No. R 109-300/07.06.2023 of the Rector of the University of Varna, based on the report No. 102-1020/18.05.2023 of Assoc. Nataliya Usheva MD, Head of the Department of "Social Medicine and Health Care Organization" and with the decision of the Faculty Council of the Faculty of Health under protocol No. 206/23.05.2023 and report No. 104-576/01.06.2023. by Prof. Antonia Dimova - Dean of the Faculty of Health Sciences, I was chosen as an external member of the scientific jury, and Reccord №1 I was assigned to present a review of the dissertation on the topic "Effectiveness and prospects of simulation technologies in the education of students from health specialties" for awarding of the educational and scientific degree "doctor" in the scientific specialty "Public Health Management", professional field 7.4. Public Health.

Brief biographical data of the PhD student. Born on May 9, 1973, he graduated from the Mathematical High School in Varna, and in 1997 from the Technical University - Varna, majoring in Electrical Engineering and Microelectronics. In the period 1997-2012, he was the general manager of SD "Delphin - 3". Since 2012, he is the Assistant Rector of MU-Varna. He participated in 8 projects, five of which are under the Operational Program "Development of Human Resources" and the rest under the Operational Program "Science and Education for Intelligent Growth". He has a good command of written and spoken English and Russian languages. Enrolled as a doctoral student at the SMHCO Department. About the doctoral studies, he fulfilled the scientometric requirements of the Rules of MU-Varna and by Order of the Rector of MU-Varna R-109-300/ 07.06.2023, he was dismissed with the right of defense. No violations in the procedure were found.

General characteristics of the dissertation work

The presented dissertation contains 147 pages of text with 15 tables, 20 pages of references, and 8 appendices of 21 pages. The bibliographic reference includes 233 literary sources, of which 2 are in Cyrillic and 231 are in Latin.

The material is structured in the following several main sections: Introduction and Literature Review - 68 pages; Purpose, Tasks, Hypotheses, Material and Methods - 8 pages; Results and Discussion - 58 pages; Conclusion; Conclusions, Recommendations, Contributions - 6 pages.

Actuality of the dissertation.

The widespread opinion about the conservatism of medical education is only partially true, and mainly in terms of its object. Several factors such as ensuring patient safety, difficulties with high-risk patients, emergency conditions, and rare diseases require a rapid orientation towards a wider use of simulation techniques and methods in medical education. The need for the community of teachers from higher medical schools in Bulgaria to be familiar with the problem makes the dissertation work timely and significant. The lack of research on implemented simulation methods in our country strengthens its relevance - it traces paths for their greater applicability, quality, and evaluation of their effects on the final product of medical education. As a first study on the problem, the work fills an obvious gap in our scientific literature.

Evaluation of the Literature Review. The doctoral student has logically built the literature review on several selected topics, which are indeed essential from a content point of view: a general characteristic of simulation technologies, their application in the training of students and specialists in various medical specialties, their quality and effectiveness, mark the long history of the use of simulation methods in medical education, the doctoral student dwells on the latest research related to modern technological achievements - simulation through extended, virtual or augmented, reality, three-dimensional printing, computerized simulation, interactive virtual simulation, simulation mannequins. Results are reviewed from research in the application of ST training in surgery, laparoscopic and robotic, imaging diagnostics, dentistry, anesthesiology and intensive care, obstetrics and gynecology, orthopedics and traumatology, neurosurgery, nurses and midwives, etc. The literature review is a rich source of information, and innovation, which is eloquently demonstrated by the fact that a percentage of the literary sources are dated after 2020. In its content, the literature review represents a modern study of ST in the education of medical specialties. It occupies a significant part of the work and answers the first two tasks set in it. The review is self-contained and its publication would play a positive role in familiarizing the interested community with the application of ST in medical education, as well as in stimulating research work on the issue. Given the small number of studies on the issue in our country, this characteristic of the literature review determines its significant contribution. The conclusions of the literature review are the basis of the questions that are further explored in the dissertation work.

Evaluation of objectives, tasks, and methodology. The dissertation work aims to analyze the application, efficiency, and prospects of simulation technologies in the education of students of health specialties. To fulfill the goal, five tasks were set and three hypotheses were formulated. The following methods are applied:

Documentary - for a historical overview of the creation, introduction, and application of simulation technologies (ST); study of different types of ST, trends in their modern development; analysis of the regulatory framework for regulating their application;

A. Survey method - to study:

a) the attitudes, and experiences of the students of the specialty "Medicine" V course - 186, incl. 10 - BLE and 85 - ALE and from the specialty "Dental Medicine" - III course - 73, incl. 47 - BLE and 26 - ALE;

b) the knowledge, attitudes, previous experience, and experiences of ST application, as well as assessment of the students' work with ST - among the teachers from the Department of Obstetrics and Gynecology at MU-Varna;

B. Experimental study - to evaluate training with the CAE Fidelis Lucina maternal-fetal simulator in labor management and first care of the newborn in medical students. A comparison was made between two groups: control - with theoretical training and without prior training on a simulator and experimental - with theoretical training and preceding the performance of the task on real patients, training on a simulator. Evaluation criteria have been developed for the success rate of students on a 5-point scale.

C. Qualitative method for expert assessment of the barriers, ethical aspects, and perspectives of ST in education - among experts (17 people), representatives of institutions, and units related to the development, introduction, and application of ST in medical educational institutions.

D. Statistical methods - descriptive methods (frequency analysis of qualitative variables and variance analysis) and hypothesis testing methods (parametric and non-parametric).

For each of the researched groups, with a certain method, an adequate toolkit was developed in the form of questionnaires that correspond to the tasks set.

The overall study design is well described, meets the criteria for modern scientific research, and inspires confidence in the results obtained.

Evaluation of results and contributions.

The results are presented according to the individual studied groups, and the data are discussed in the context of modern foreign studies, taking into account the statistical dependencies. A rich discussion increases the scientific value of the work. The recommendations of the respondent groups derived from the survey are valuable information for managers in higher education institutions at different levels when preparing management decisions.

Among the most important results by studied groups can be noted:

For the students of "Medicine" and "Dental medicine" specialties: they have opportunities for learning simulators, but they speak for increasing the number and increasing access to them; according to 57.4% of medical students and 62.2% of dental students, the use of ST is insufficient during practical classes. Students' satisfaction with recreating different clinical conditions when using simulators during training is statistically more valid for medical students compared to dental students. There are no significant differences between Bulgarian- and foreign-language-educated students. Students with interests in internal medicine, psychiatry, and health care express a preference for simulated patients, and surgically inclined students are highly motivated to work with advanced surgical simulators.

For students from the specialty "Medicine" with a task in obstetrics and gynecology - higher average grades/achievement and greater certainty in subsequent treatment were found in the experimental group compared to the control group of students.

According to experts and partly to teachers, the main barriers to the wide application of ST for training female students and specialists are curricula that do not include the combination of traditional practical classes with patients and those with simulators; the large number of students in a group; insufficient number

of trained teachers in the field of ST and motivated to work for their introduction into practice; the high costs of purchasing and maintaining ST against the backdrop of limited financial resources.

The prospects outlined based on the results for the development and positioning of ST in a worthy place in the education of students in higher medical schools point to the following as mandatory conditions for this: adoption of a regulatory framework for the mandatory use of ST in medical schools, institutional support by providing appropriate equipment and a sufficient number of trained and motivated personnel; a methodology for adapting curricula to combine traditional with ST learning, for teaching, assessment, and certification of acquired knowledge.

The abstract reflects the most essential aspects of the dissertation work. In connection with the dissertation, three full-text publications were made in Bulgarian journals, one in Bulgarian and two in English.

The critical remarks made by me at the meeting of the Departmental Council on the dismissal of the doctoral student have been taken into account.

I agree with the contributions formulated by the doctoral student, which are based on the fact that they are the result of the first multifaceted study in our country regarding the effectiveness and perspective of modern simulation technologies for training medical and dental students. Within its framework, the attitudes and experience of applying ST in the education of students from the specialties "Medicine" and "Dental Medicine" were studied; an experimental study was conducted for the first time in Bulgaria on the effectiveness of the application of ST in the education of students in the discipline "Obstetrics and Gynecology", specialty "Medicine"; a first qualitative analysis was carried out to identify the main barriers to the wide application of ST in the education of students and specialists in health specialties in Bulgaria. The contributions have a theoretical-cognitive character and potential for practical application.

Conclusion

The dissertation work of Eng. Deyan Grigorov Grncharov on the topic "Effectiveness and prospects of simulation technologies in the education of students from health specialties" in terms of relevance, volume, and quality of the development, as well as the significance of the contributions, meets the requirements of the Law on the Development of the Academic Staff in the Republic of Bulgaria and Rules of the MU - Varna for its implementation.

In connection with all above, I confidently give my positive assessment and recommend to the honorable scientific jury to award the educational and scientific degree "PhD" in the scientific specialty "Public Health Management", professional direction 7.4. Public health of Eng. Deyan Grigorov Grncharov

04/09/2023

Reviewer:

/Assoc.prof. Nevyana Feschieva, MD/