

Digitalization of Educational Materials and Establishment of Electronic Archive in the Rehabilitation Field

Ivet B. Koleva¹, Borislav R. Yoshinov², Radoslav R. Yoshinov³

¹ Medical University of Sofia, Sofia, Bulgaria

² Medical Faculty of Sofia University, Sofia, Bulgaria

³ University of Library Studies and Information Technologies, Sofia, Bulgaria
yvette@cc.bas.bg, borislavyoshinov@gmail.com,
radoslav.yoshinov@gmail.com

Abstract. Our objective is digitalization of educational materials and creation of an electronic archive of the theoretical knowledge and practical skills in the field of physical medicine. We prepared electronic books in different rehabilitation fields. A secondary task was to assess students' and trainees' opinion about e-learning, and efficacy of the application of this e-archive. The analysis of results of an online questionnaire demonstrates the satisfaction of our responders.

Keywords: Rehabilitation, Education, Electronic Learning, e-Archive.

1 Introduction

During last years, we perceive a gradual increase of application of information and communication technologies (ICT) in all fields, including higher education.

Physical medicine is one of the most rapidly changing areas of science and practice. We observe an acceleration of the introduction of modern methods in different areas of our rehabilitation practice. Therefore, we perceived increased risk to harm the Bulgarian scientific traditions in the rehabilitation field and risk to disremember the heritage of our teachers.

The definition of electronic learning (e-learning), according the European Center for Development of professional education and training, stands: "learning, supported by ICT" or "education and training, mediated by information and communication technologies, including different formats and hybrid methodologies, like programming systems, Internet, CD-ROM, education by PC in regime of real time, and other electronic or interactive devices." (CEDEFOP, 2008). E-learning is "an application of modern multi-media technologies and Internet, with the objective of amelioration of the quality of education" (Chapman, & Hall, 2001; Dochev, et al., 2000). According Commonwealth of Learning (COL, 2015), eLearning is an umbrella term that refers to the use of any digital device for teaching and learning, especially for delivery or accessing of

content. Thus, e-Learning can take place without any reference to a network or connectivity. The digital device used by the learner to access materials need not be connected to a digital network, either a local area network or to the Internet (or even to a cell phone network if a Tablet is used as a terminal or access device).”

Many authors consider necessary the introduction of e-learning and adaptive learning in Universities’ curricula in our country (Monova-Zheleva, 2005; Monova-Zheleva et al., 2009, 2021). Others assessed specifically the need of vocational training and medical e-learning in Bulgaria (Koleva, Zhelev, Monova-Zheleva, & Avramescu, 2016).

According World Federation for Medical Education (WFME, 2015), the need for harmonization and development of unitary systems in medical education worldwide with common standard procedures is a well-known fact. Therefore, we decided to create an electronic archive of the information in the area of physical medicine and physical therapy, and to digitalize our educational materials.

2 Objectives

Our basic goal was to digitalize the educational materials and to create an electronic archive of the theoretical knowledge and practical skills - in the fields of physical medicine, physical therapy and rehabilitation. A secondary task was to assess students’ and trainees’ opinion about e-learning, use and efficacy of the application of this e-archive.

3 Material and Methods

3.1 Design of the Study

We prepared electronic books in different thematic fields of physical medicine, physical therapy and rehabilitation (Koleva., 2019; Koleva, Yoshinov, 2019; Koleva, Yoshinov, Yoshinov, 2020; Koleva, Yoshinov, Yoshinov, Koleva, 2020; Koleva et al., 2020). Old books (from 2015-2016) were digitalized. New books were created, including principal bases of different natural and preformed physical modalities, and the application of these physical factors on the prevention and rehabilitation of socially important diseases. Presentation of clinical cases were included (with neurological, orthopedic and cardio-vascular conditions). Students and trainees received the electronic books free-of-charge.

We applied the e-archive in the education of our students and trainees. At the end of the respective educational course, we tested the students’ interest about e-learning in the field and the students’ opinion about the efficacy of application of these e-books on their professional competences. The target groups received questionnaires electronically (by e-mail) or directly (after the end of lectures and after the exam of the corresponding discipline, but before the communication of the exam’s results). Our goal was to evaluate learners’ satisfaction of the introduction of the e-learning and the e-books.

Current article includes responders' opinion on the use of the e-archive during the educational process of students and trainees in the field of rehabilitation.

Data for current investigation were collected during the period from February 2020 to May 2022 with students and trainees of the Medical University of Sofia, Medical Faculty of Sofia University, and Daugavpils University - Latvia (where the first author was invited lecturer).

3.2 The Electronic Books

We prepared electronic books in different rehabilitation fields: kinesiological analysis, preformed physical modalities, balneotherapy, manual therapy, physical prevention, rehabilitation and ergotherapy in orthopedic conditions and in neurological diseases.

Some of e-books are in Bulgarian language and are designated to Bulgarian students and trainees (Fig.1 and Fig.2); others are in English – for foreign scholars (Fig.3).



Fig. 1. Electronic books for Bulgarian students and trainees: Kinesiological and Pathokinesiological analysis, Balneotherapy, Clinical Ergotherapy.



Fig. 2. Electronic books for Bulgarian students and trainees: Introduction to physiotherapy and rehabilitation, Contemporary preformed physical modalities, Manual therapy.



Fig. 3. E-books in English – for foreign students: Orthopedic rehabilitation, Neuroreh, Manual therapy, Repetitorium physiotherapeuticum.

3.3 Material

The e-books were included in the process of education of different types of undergraduate and post-graduate students – medical specialists and health professionals. The questionnaires were sent to: bachelors and masters in “Physiotherapy” (“Kinesitherapy /KT/” in our country), bachelors and masters in „Medical Rehabilitation and Ergotherapy /MRET/“, masters in „Medical Rehabilitation and Balneology /MRB/“, masters in “Medical Cosmetics /Med-Cosm/”, medical doctors /MD/- trainees in „Physical and Rehabilitation Medicine /PRM/“; medical specialists /MD-PRM/ and health professionals /physiotherapists-PT/- participants in long life learning (LLL) courses.

The following Table 1 gives a summary of the received fully completed questionnaires from different types of tested students and trainees, divided by level of education:

Table 1. Distribution of the responders – by specialty.

	KT	MRET	MRB	Med Cosm	PT	MD - trainees	MD - PRM	Total
Bachelors	115	29	-					144
Masters	11		25	22				58
LLL					45	12	9	66
Total	126	29	25	22	45	12	9	268

3.4 Methods

For current study, we applied different methods: Screening, Questionnaires, Analysis of documents, Statistics.

The online questionnaire explores responders’ opinion about electronic education, e-archive, e-books, educational videos, advantages and disadvantages of e-learning.

4 Results and Discussion

We create the e-archive and we applied e-learning with the goal to ameliorate professional competences of our students and trainees.

Responders' opinion of e-books and e-archive was satisfactory for us.

4.1 Responders' Opinion about the e-Archive and e-Books

Practically all responders (97 %) accept easily the electronic education and the e-platform. Most of them (95%) express satisfaction of the possibility to use e-materials and video-films concerning contemporaneous theoretical knowledge and modern practical methods. About 50 % of participants in LLL-courses consider that e-education is an effective way to implement international experience in the rehabilitation field.

The assessment of responders' opinion about the introduction of the e-book and the creation of e-archive is positive. The anonymous investigation of the level of satisfaction of all students and LLL-participants demonstrated affirmative opinion and satisfaction of responders concerning the e-learning and the e-archive, presented on Table 2.

Table 2. Responders' opinion about the necessity of the e-archive

<i>Anonymous opinion</i>	Number of responders	Percent
Strongly positive	216	80,60 %
Positive	36	13,43 %
Maybe Yes	10	3,73 %
Indifferent	4	1,49 %
Maybe No	2	0,75 %
Negative	0	0 %
Strongly negative	0	0 %
<i>Total</i>	268	100%

Practically 252 of 268 responders (or 94.03 % of responders) accepted the e-archive and e-books with a positive opinion (strongly positive, positive). 'Maybe yes' was the answer of 10 persons (3,7%). Four responders were indifferent (1,5 %). Two participants answered "Maybe no" (0.75%). No negative and strongly negative answers.

4.2 Discussion

Bulgarian students and trainees are interested by electronic education (e-platforms and training). Electronic learning is interesting for our responders, because they consider many *advantages*: access to interactive multi-media materials, results of investigations in many scientific applications from all the world, possibility of information exchange, potential of knowledge and application of international standards of education. Students and trainees indicated some *limitations of the e-learning* in the clinical practice of rehabilitation. For education of theoretical knowledge, e-learning is sufficient, but many

practical skills require traditional educational process with participation of a real patient (and presentation of clinical cases is not enough). On the other hand, video presentation of clinical cases is very useful in rehabilitation of rare diseases.

They would like to receive detailed information about some specialized and highly specialized techniques of electrostimulations, lasertherapy, physiotherapy, hydrokinesitherapy, occupational therapy. Quasi all of them are interested in learning grasp, balance and gait analysis; robotic rehabilitation, virtual reality rehabilitation. These are possible directions for *future investigations*.

5 Conclusions

The application of electronic learning, based on this e-archive, is useful for the development of professional competences of our students and trainees. All responders underlined the importance of ICT implementation in the field of physical medicine and rehabilitation - with the objective of amelioration of the quality of care and the quality of life of patients.

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The other elements of the e-archive (bases of physical medicine, neurorehabilitation and cardiorehabilitation, fragments of orthopaedic and traumatologic rehabilitation) were developed without financial support. No conflict of interests.

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