

# E-LEARNING CONTINUOUS MEDICAL EDUCATION OF HEALTH WORKERS

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**Abstract** Continuing medical education (CME) is the right and obligation of every health worker for continuous professional development and one of the conditions for license renewal. The need for CME arose as a consequence of constant innovations in medicine as a science, as well as the introduction of new technologies in therapy, diagnostics and health care. It is necessary (mandatory) for all health workers, because it provides monitoring and reform of the education and health system according to WHO recommendations. A CME is a set of educational activities that serve to maintain, develop, or increase the knowledge, skills, and professional accomplishments and relationships that a physician and other health care professionals use to provide services to patients, the public, or the profession. The CME system ensures that the latest knowledge and the latest treatment techniques are transferred through additional and continuous form of internal or external training to doctors and medical technicians, and aims to raise the level of expertise and improve the quality of health care in all forms of health care and daily practice. E-learning is a step forward in CME. The aim of this paper is to present the e-learning system of education of medical workers in Serbia, as well as to present the attitudes of health workers about e-learning continuous medical training through empirical research.

**Keywords:**

e-learning, continuing medical education, WHO, CME in Serbia, Health workers

## 1 Introduction

The modern economy of the global world today bases its development and prosperity on human resources, knowledge, information, quality, speed and standards. Knowledge has become the fundamental capital, the basis of development and the creator of the new economy.

In order for man, as a creator and bearer of all social prosperity, to remain that all the time, his education and development must be permanently invested in, wherever and in whatever activity he may be, even when he is out of the working process.

Education is a social process which concerns the acquisition of knowledge and it represents one of the conditions for acquiring the right to work as well as personal goals of an individual. It is a fundamental component of human development and an important determinant of human activity, both material and spiritual in nature. Education is a process of acquiring both theoretical and practical knowledge which represent factors in overall social development. It is the most important component of production forces, production relations and business in general. Knowledge essentially determines social and human development. Acquisition of knowledge is a process that takes place throughout the working process, ie the whole life.

In accordance with that, health workers and associates have the right and duty to monitor the development of the medical, dental and pharmaceutical professions and to improve their skills in order to maintain and improve the quality of their work. They are also obliged to obtain a certain number of points necessary for the periodic renewal of the license through continuous medical education.

Continuing medical education (CME) is becoming a minimum condition for adapting to today's changes and for achieving success in both professional and personal areas. The motto of Continuing Medical Education (CME) is to update knowledge, skills, and cooperation in order to improve the practice of physicians and associates.

The development of information and communication technology has greatly influenced the field of education. E-learning is actually a process of learning supported by modern technology. The most important segment of this kind of learning is independence from place, time and space. That is why this form of education enables great adaptation to users, their needs and wishes.

E-learning refers to learning enabled through electronic technology. It encompasses learning achieved through technology such as the Internet, television, video materials, mentoring systems, and basic computer training.

E-learning can be useful when used as part of a well-planned and appropriately supported education and training.

## **2 Theoretical bases**

In the last few years, more and more has been said and done on the development of continuing medical education. The education of medical personnel definitely does not end with obtaining a doctor's degree and passing a professional or later specialist exam. Modern medicine requires constant training of doctors in different ways. Many countries have imposed on their doctors the obligation of continuing training through a system of continuing medical education (CME) or, more recently, increasingly popular and, more importantly, more comprehensive, continuing professional development (CPD). (Lugonjić, 2020) Through this system, it is ensured that the latest knowledge and the most modern treatment techniques are transferred to doctors who will apply them in everyday practice. The most common way of transferring knowledge is through various seminars, professional gatherings and courses, whose participants, depending on the level and scope of presented knowledge and the existence of verification of acquired knowledge, receive a certain number of credits (points) which are recorded and added to those previously acquired. An increasingly present way of knowledge transfer is electronically, through various CME and CDP portals. (Lugonjić, 2020)

E-learning is growing rapidly as an alternative mode of education (Lathi, Hatonen, Valimaki, 2014; Vaona, Banzi, Kwag, et al. 2018). Nicoll et al (Nicoll, MacRury, van Woerden, Smith, 2018) used the term technologically advanced learning and stated that “it is a means by which students can be provided with improved or transformed

educational experiences". Many other terms have been used synonymously and interchangeably to denote e-learning, such as computer-assisted learning, online learning, or online-based learning (Sinclair, Kble, Levett-Jones, Booth, 2016). For the purpose of this paper, we will use e-learning as an umbrella term that implies a range of electronic, digital or mobile devices used to support learning (De Caro, Marucci, Lancia, Sansoni, 2016). Clark and Mayer (Clark, Mayer, 2016) list elements about what, how, and why e-learning in the first place. What does the content and teaching methods include? The mode includes elements such as format (eg Asynchronous and web seminars) and the use of multimedia (eg video, animation and printed words). Why, for example, is it about achieving learning goals and / or deriving skills applied in a workplace context.

In the literature that analyzes the use of e-learning in care, two populations and contexts are considered. The first is education among nursing students (Voutilainen, Saaranen, Dormunen, 2017) who participate in educational programs that are mainly offered in academic settings. For example, undergraduate nursing students must develop initial competencies to meet the practice expectations required to obtain a registered nurse (RN) license to provide safe, competent, compassionate, and ethical care in a variety of practice environments. Another context is continuing education (CE), also called continuing professional development (Legare, Freitas, Thompson-Leduc et al. 2015) or continuing competence (Rouleau, Gagnon, Cote, et al. 2017), targeting a lifelong learning perspective and staff development (Knapp, Vyers, 2008). All healthcare employees (both doctors and other staff) must meet CE expectations in order to be eligible to renew their license and registration each year, with the aim of acquiring new competencies, maintaining acquired ones, improving their practice and keeping their skills relevant and up to date (Rouleau, Gagnon, Cote, et al. 2017). Here we refer to CE programs that are applicable in workplace settings. The use of e-learning by health professionals in context is one that has held our attention (Rouleau, Gagnon, Cote, et al. 2017) for two main reasons: much more attention is paid to students than employees (De Caro, Marucci, Giordani, 2014), which is significant when talking about CME and DC. The findings of previous research show that e-learning is equivalent to traditional learning. (De Caro, Marucci, Giordani, 2014; Rouleau, Gagnon, Cote, et al. 2017; Cook, Levinson, Garside, Dupras, Erwin, Montori, 2008) However, e-learning has been shown to have great effects compared to not to make any interventions in education in the health

professions (Rouleau, Gagnon, Cote, et al. 2017; Cook, Levinson, Garside, Dupras, Erwin, Montori, 2008).

### **3 Empirical research of CME through e-learning**

#### **3.1 Methodology**

The empirical research of e-learning of CME regarding health workers in Serbia has been done through the analysis of sites and portals for e-learning and through examining the attitudes of doctors and other medical personnel about e-learning.

For the analysis of sites and portals for e-learning of health workers in Serbia, the method of content analysis was used, as well as the descriptive method.

The empirical research was conducted by using an electronic questionnaire for examining the attitudes of medical workers about e-learning. The questionnaire was created for the purposes of this paper. The questionnaire consists of two parts: the first part consists of the socio-demographic characteristics of the respondents, and the second part consists of 11 statements that were evaluated on the Likert scale. Descriptive analysis was used for data analysis.

The goal of the research is to examine the attitudes of medical workers about e-learning, as a basis for successful implementation and further improvement of CME.

#### Research hypotheses

Hypothesis H0 Healthcare workers in Serbia believe that there is a difference between the quality of learning in the classical way and e-learning in favor of classical learning.

Hypothesis H1 Healthcare workers in Serbia believe that distance learning should become an integral part of the CME strategy, and that the most optimal way is the combined way of learning.

#### Research sample

The research on the attitudes of medical workers about e-learning was conducted on the territory of the Republic of Serbia during December 2020. 124 respondents participated in the research. Of the total number of respondents, 38.7% or 48 were

male and 61.3% or 76 were female. Observed by age groups, respondents were divided into 5 groups: up to 25 years - 20 - 16.3%, from 26 to 35 years - 55-44.7%, from 36 to 45 years - 25 - 20.3%, from 46 to 55 years - 18 - 14.6% and over 56 years - 5 respondents, or 4.1%. According to their education, there were 23 general practitioners (33.3%), 11 doctors of specialization (15.9%), 27 specialist doctors (39.1%), and 8 doctors of medical sciences (11.6%). There were 92 health workers and consultants (medical technicians, laboratory technicians, health care organizers, radiologists, instrumentalists, biologists, biochemists, pharmacists, psychologists), of which 21 (22.8%) with secondary education, 8 (8.7%) ) with completed basic vocational studies, 23 (25%) with basic academic studies, 27 (29.3%) with master's academic studies and 13 (14.1%) with doctoral academic studies. 45% of respondents have up to 5 years of experience, 18% from 6 to 10 years, 18% from 11 to 20, 13 to 30 years of experience have 13.5% of respondents and 5.4% have over 30 years of experience. 65% work in the public sector and 34.5% in the private sector.

Independent variables were gender, age, level of education of respondents, years of experience, ownership structure of the institution in which they work, and with dependent variables we examined respondents' opinions on e-learning through 11 statements that respondents rated on the Likert five-point scale.

**Table 1: Statements on e-learning**

STATEMENT
Distance learning provides more motivation to acquire knowledge
There is no difference in the quality of acquiring knowledge through distance learning and traditional lectures
Distance learning provides the possibility of independent evaluation
Distance learning provides independence from place and time
Distance learning requires special computer skills
Face-to-face contact is necessary for acquiring and mastering matter
Distance learning enables faster and easier memorization of matter
Distance learning enables faster exchange of information with colleagues
Distance learning enables mastering any subject in the field of medicine
Combined learning is the most optimal type of learning
Distance learning should become an integral part of the CME strategy

Source: Review by the author

### **3.2. Analysis of sites and portals for e-learning of health professionals**

**PKME** is an online platform for Continuing Medical Education (CME) that was developed in accordance with the decisions of the Ministry of Health and the regulations of the Health Council at the Ministry of Health of the Republic of Serbia. The online platform for CME represents a technical prerequisite for the implementation of educational programs and tests accredited by the Health Council for performance in electronic (online) form. The platform is implemented so that it can be used for their needs by health institutions (institutes, clinics, hospitals, health centers ...), doctors' and professional medical associations as well as all other institutions and associations that are legally authorized to organize medical education programs. The application can be used by educational institutions as well as all other institutions that have a need for testing in electronic form. (<https://www.pkme.rs>)

This platform enables users to take accreditation tests and earn points when it suits them and according to their professional needs. Users are provided with educational material with full content, including video material, pictures and presentations. Educational material can be set as a case report, where participants, during their work and preparation for testing, get acquainted with the material through interactive work on specific examples and they receive detailed expert explanations.

The accreditation test is very flexible and covers different applications, depending on the needs of the organizers or authors.

The platform is clear, navigation is very easy, and the authors, who have successfully accredited the training program, can set, test and activate the accreditation test or interactive case presentation completely independently.

The application, in addition to the mandatory 15-day creation of reports for the Health Council, allows all registered users to obtain analysis regarding the number of participants and the success of testing, for each individual accreditation program as well as collectively on an annual basis.

Using **PKME online**, healthcare employees in Serbia passed, according to the portal data, more than 30,000 tests through over 30 free educational programs accredited by the Health Council of Serbia, as follows: 54% of general practitioners with others more than 30 medical specialties, 43% of doctors from 130 health centers, 23% from general hospitals and 33% from other institutions out of a total of over 250 participating institutions. Most participants were from Belgrade - 20%, then from Niš - 8%, Novi Sad 6%, and, given the number of employees, there follow Leskovac, Kraljevo, Kragujevac, Cacak, Kosovska Mitrovica, Sabac and Prijepolje with a smaller percentage.

**PKME online** is networked with the Serbian Medical Association, which facilitates the use of content that is available to all doctors and is free for all SLK members. (<http://www.lks.org.rs/kme>)

The City Institute for Lung Diseases and Tuberculosis, Belgrade, is also networked with PKME online thus enabling the platform to be open to all doctors.

The Association of Nurses-Technicians and Midwives of the Republic of Serbia has developed its Educational Platform for online education for members of its association (<https://platforma.umsts.org/>). On this platform there are programs of continuous education for nurses, midwives and health technicians, as well as programs for doctors, pharmacists, dentists and other specialists. All programs offered on the platform are accredited by the Health Council of Serbia and can be used to prolong or renew the license.

The Academy for Continuing Medical Education as a non-governmental and non-profit association from various fields of medicine on its website <http://akademijazakme.edu.rs/> has a special page with electronic materials for permanent learning, according to fields of medicine and type of work (doctors, nurses and technicians). Through the AKME website, medical professionals can also take electronic tests and obtain the appropriate certificate. As with the presented platforms for e-CME, this site also exclusively contains programs that are accredited by the Health Council of Serbia.



MedScape is an association for the development of medical education and management, which, among other things, deals with the study of various technological and technical possibilities of continuing education and the development of various effective methods and techniques, including the modern concept of online education. On its website it offers over 50 online accredited contents, as well as the possibility for taking online tests. (<https://medscape.rs/>)

The MedScape site also has a page where you can visit various webinars, which mainly present various products of pharmaceutical companies through lectures by specialists in certain fields of medicine. (<https://medscape.rs/sr/webinari>) The webinars have been taking place since May 2020.

In addition to the above, there are several other sites through which e-learning is conducted, but they rely on texts in PDF format and on the possibility of taking tests online to extend or renew the license.

Healthcare workers in Serbia are also able to use the European CME portal and all its possibilities, as well as other portals and sites for permanent online education that offer content for professional development and deepening of knowledge in various fields of medicine.

### **3.3 The analysis of attitudes of medical workers about e-learning**

Table 2 contains the results of respondents' attitudes about e-learning.

The analysis of the obtained data showed that only 29.6% of respondents fully or partially believe that distance learning provides more motivation to acquire knowledge, while 65% of them think that there is a difference in the quality of obtaining knowledge through distance learning and traditional lectures. 51.2% of respondents believe that distance learning provides independent evaluations, and as many as 81.3% think that it provides independence from place and time. A very large number of respondents think that distance learning requires special computer skills, as many as 74.1%. 67% of respondents partially or completely agree with the statement that face-to-face contact is necessary for acquiring and mastering the material, and only 20.1% of them agree that it enables faster and easier memorization. 74.8% of respondents agree that distance learning makes it possible

to have faster exchange of information with colleagues. However, only 22.5% of them think that mastering any subject in the field of medicine is possible this way. 82.8% of surveyed health workers agree with the statement that combined learning is the most optimal type of learning, and 46.8% of them believe that it should become an integral part of the CME strategy.

**Table 2: Results of respondents' attitudes about e-learning in percent**

STATEMENT	1	2	3	4	5
Distance learning provides more motivation to acquire knowledge	7,3	32,3	15,3	24,2	21
There is no difference in the quality of acquiring knowledge through distance learning and traditional lectures	5,7	24,4	4,9	26	39
Distance learning provides the possibility of independent evaluation	13,8	37,4	20,3	16,3	12,2
Distance learning provides independence from place and time	41,5	39,8	7,3	6,5	4,9
Distance learning requires special computer skills	30,6	43,5	3,2	12,9	9,7
Face-to-face contact is necessary for acquiring and mastering matter	32,3	34,7	8,9	16,1	8,1
Distance learning enables faster and easier memorization of matter	3,2	16,9	31,5	20,2	28,2
Distance learning enables faster exchange of information with colleagues	28,5	46,3	10,6	8,1	6,5
Distance learning enables mastering any subject in the field of medicine	4,8	17,7	21,8	15,3	40,3
Combined learning is the most optimal type of learning	40,2	42,6	6,6	5,7	4,9
Distance learning should become an integral part of the CME strategy	13,7	33,1	25,8	12,1	15,3

1-I agree totally, 2- I agree partially, 3- I am not sure, 4 – I disagree partially, 5 – I disagree totally  
Source: Review by the author

The data obtained from the research, as shown in Table 2, confirm the hypothesis H0 Healthcare workers in Serbia believe that there is a difference between the quality of learning in the classical way and e-learning in favor of classical learning.

The answers to statements 1, 2, 5, 6, 7 and 9 speak in favor of the traditional way of learning.

**Table 3: Responds to statements in favor of the traditional way of learning**

STATEMENT	1	2	3	4	5
Distance learning provides more motivation to acquire knowledge	7,3	32,3	15,3	24,2	21
There is no difference in the quality of acquiring knowledge through distance learning and traditional lectures	5,7	24,4	4,9	26	39
Distance learning requires special computer skills	30,6	43,5	3,2	12,9	9,7
Face-to-face contact is necessary for acquiring and mastering matter	32,3	34,7	8,9	16,1	8,1
Distance learning enables faster and easier memorization of matter	3,2	16,9	31,5	20,2	28,2
Distance learning enables mastering any subject in the field of medicine	4,8	17,7	21,8	15,3	40,3

Source: Review by the author

Analyzing the data from Table 3, it can be concluded that health professionals believe that it is not true that any subject in the field of medicine can be mastered by e-learning, and that this requires face-to-face contact. Further, opinions are that e-learning requires special knowledge and computer skills, and that there is a difference between the quality of acquiring knowledge through e-learning and traditional learning, and that e-learning does not provide more motivation to acquire knowledge, nor faster or easier memorization.

Hypothesis H1 Healthcare professionals in Serbia believe that distance learning should become an integral part of the CME strategy, and that it is the most optimal combined way of learning has also been confirmed.

Table 4 provides data which confirm hypothesis H1.

82.8% of respondents believe that combined learning is the most optimal form of learning, and 46.8% of respondents believe that distance learning should become an integral part of the CME strategy.

**Table 4: Responds to statements in favor of the traditional way of learning**

STATEMENT	1	2	3	4	5
Combined learning is the most optimal type of learning	40,2	42,6	6,6	5,7	4,9
Distance learning should become an integral part of the CME strategy	13,7	33,1	25,8	12,1	15,3

Table 5 provides the answers of the respondents which show that they agree with only three statements that speak in favor of e-learning, ie. distance learning.

**Table 5: Results of respondents' attitudes about e-learning in percent**

STATEMENTS	1	2	3	4	5
Distance learning provides the possibility of independent evaluation	13,8	37,4	20,3	16,3	12,2
Distance learning provides independence from place and time	41,5	39,8	7,3	6,5	4,9
Distance learning enables faster exchange of information with colleagues	28,5	46,3	10,6	8,1	6,5

By analyzing three statements (3, 4, 8) from the questionnaire, it can be concluded that respondents fully or partially agree with the statements that distance learning provides the possibility of independent evaluation (51.2%), that distance learning provides independence from place and time (81.3%) and that it enablea faster exchange of information with colleagues (74.8%).

## **Conclusion**

Based on theoretical analysis and previous research, it can be concluded that e-learning, as well as distance learning is an essential need of modern lifelong learning, and thus of continuing medical education.

The thing that research to date has shown is the fact that the effectiveness of e-learning in the context of continuing medical education remains unknown in terms of how practical skills can be transferred and how it can affect patient outcomes. Further scientific, methodological, theoretical and practical advances are needed in the rapidly growing field of e-learning in medical education in general, and in the CME perspective in particular.

After the theoretical analysis and previous research, we must conclude that in the coming period it is necessary to focus research on determining the context and mechanisms through which medical professionals transfer their knowledge and skills acquired through e-learning into practice and, consequently, how they can lead to specific outcomes regarding patients. How does it work?

Researchers should further focus on how health professionals perceive e-learning interventions in their work environment, and how they describe its impact on their practice or their environment. The answers to the above questions could be obtained if a metasynthesis of qualitative studies were to be performed. It would also be useful for the authors of the primary studies to provide sufficient information regarding the intervention, context, and mechanisms, including the theoretical basis, in order to allow researchers to understand the components that may affect outcomes.

Other types of outcomes that may be associated with e-learning in working conditions should be further explored. In this regard, Berntt et al. (Berndt et al. 2017) believe that the link between the CME approach and labor retention is unknown and should be investigated as well. Research could also be done on the impact of e-learning on the resources or structures of physicians and nurses on workplace retention and working conditions.

Findings from the literature and research show that the effects of e-learning are mainly reported in terms of reactions, knowledge, attitudes, self-efficacy and skills. The effectiveness of e-learning used by healthcare professionals is still an unknown in terms of how learning can be transferred to change of practices and how it would affect the outcomes of patients' treatment. Further scientific, methodological, theoretical and practical advances should encourage the rapidly growing field of e-learning in medicine, especially in the CME perspective.

Based on the research of e-learning sites and portals, as well as the attitudes of medical workers about e-learning, it can be concluded that these two segments are inconsistent. Namely, the analyzed portals and sites are very rich in e-content of all kinds for e-learning, especially in the perspective of CME. However, the attitudes of health professionals point to the fact that they are still more focused on the traditional way of lifelong learning, and that they believe that e-learning is possible only as a supplement to traditional way of learning and can not be used to master any subject in medicine.

It would be important that in the further development of CME in Serbia additional work be implemented on the popularization of e-learning. Further, we should take advantage of the fact that the COVID-19 pandemic has led to the fact that seminars and trainings can be conducted exclusively online. For CME in Serbia, this could be a positive aspect of the pandemic.

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