EXPERIENCE IN DELIVERING "HYGIENE AND SANITATION" AND "HYGIENIC EDUCATION" PROGRAMS TO POSTGRADUATE STUDENTS VIA DISTANCE LEARNING

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At the current stage of societal development, there is an increasing need to introduce innovative approaches to the pedagogical process to enhance the quality and accessibility of postgraduate education. The specifics of modern education are the widespread use of computer technology and the Internet, which provide connection to intelligent information systems and technologies. Such tools enable training when there is a significant distance between the student and the teacher. Telecommunication and network technologies are well integrated into postgraduate education, including programs for paramedics. This study aimed to evaluate the effectiveness of distance learning in delivering advanced training programs in "Hygiene and Sanitation" and "Hygienic Education" to postgraduate paramedics enrolled in a part-time curriculum. We surveyed 30 general hygiene assistants. The main research methods were logical analysis, generalization, systematization of published information, and reflection on digitalization experience. In the survey ranking, the highest mean score — 6.84 (6.77; 6.91) — was assigned to three questions related to the organization of the advanced training cycle and the clarity of learning goals and content. The lowest score, corresponding to the third rank, was given to the question on the effectiveness of distance learning. Although this question received a mean score of 5.37 (5.23; 5.51), it was still above the neutral level of 4 points. The results of the survey allowed suggesting that the introduction of distance learning significantly increases motivation to learn and reduces the time spent on periodic professional development.

Keywords: distance learning, postgraduate education, paramedical personnel, information systems, technology, efficiency

Compliance with ethical standards: all students gave informed consent to participate in the study.

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ОПЫТ ИСПОЛЬЗОВАНИЯ ДИСТАНЦИОННОГО ОБУЧЕНИЯ ПО ПРОГРАММАМ «ГИГИЕНА И САНИТАРИЯ» И «ГИГИЕНИЧЕСКОЕ ВОСПИТАНИЕ» В ПОСТДИПЛОМНОМ ОБРАЗОВАНИИ

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В актуальных реалиях развития общества растет необходимость использования инновационных преобразований педагогического процесса, в том числе для повышения качества и доступности постдипломного образования. Спецификой современного обучения является широкое использование компьютерной техники, Интернета с возможностью подключения к интеллектуальным информационным системам и технологиям. Такие средства позволяют проводить обучение, когда обучаемый и обучающий разделены значительным географическим расстоянием. Использование телекоммуникаций и сетевых технологий довольно обширно представлено в постдипломном образовании, в том числе для среднего медицинского персонала. Целью исследования было оценить метод дистанционного обучения на очно-заочном цикле повышения квалификации по программам «Гигиена и санитария» и «Гигиеническое воспитание» в постдипломном образовании среднего медицинского персонала. Проведено анкетирование среди 30 респондентов, работающих помощниками врача по общей гигиене. Ключевыми методами исследования были логический анализ, обобщение, систематизация опубликованной информации и осмысление опыта цифровизации. При ранжировании результатов анкетирования первый ранг с наибольшим средним баллом 6,84 (6,77; 6,91) присвоен трем вопросам, касающимся организации цикла повышения квалификации, ясности цели обучения и наполняемости информационным материалом, третий ранг с наименьшим количеством баллов получил вопрос об эффективности дистанционной формы обучения — 5,37 (5,23; 5,51), вместе с тем эта оценка была выше 4-балльного нейтрального уровня. Результаты анкетирования обучающихся позволили предположить, что внедрение дистанционного обучения показывает значительное увеличение мотивации к овладению знаниями, а также возможность сокращения рабочего времени, затрачиваемого на периодическое повышение квалификации специалистов.

Ключевые слова: дистанционное обучение, постдипломное образование, средний медицинский персонал, информационные системы, технологии, эффективность

Соблюдение этических стандартов: все обучающиеся дали добровольное информированное согласие на участие в исследовании.

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The 2017–2030 Strategy for the Development of the Information Society in the Russian Federation (RF) approved by Decree of the President of the Russian Federation No. 203 of 9.05.2017 sets nine main tasks involving use of information and communication technologies for the development of the social sphere, the public administration system, and interaction between citizens and the state. Four of these tasks relate to postgraduate medical education. They include: implementing projects to improve access to high-quality medical services and products; creating technological platforms for distance learning to expand access to quality education; motivating companies and organizations to enable remote work; and developing technologies for electronic

interaction among citizens, organizations, state agencies, and local authorities, while preserving the option for non-digital interaction [1] .

Being a medical doctor implies lifelong learning, therefore, in order to maintain professional competence, doctors have to be constantly improving, updating, and revising their knowledge. Information and communication technology is a powerful tool that enhances the quality and effectiveness of education. In the third millennium, e-learning is no longer an alternative, it is a mandatory component that should be considered by the ever-increasing number of developers and organizers of educational programs.

In addition, the COVID-19 pandemic triggered significant changes in the field of education [2–4]. Therefore, currently, the process of teaching and studying graduates to a fundamentally new level, pushed up by the various information and communication infrastructures based on the Internet-enabled equipment and integration of software and hardware constituents [5, 6]. As a result, traditional education acquires new shapes: the role of the student, who turns into an active participant of the process, becomes more prominent [7]. A new paradigm of education is emerging, characterized by global accessibility and lifelong learning that fits seamlessly into one's main activities [8]. The innovative technologies used imply an analysis through the lens of synergetics, when an individual becomes a leading factor in social development, and the inputs by this individual have an increasing value [9]. Distance learning is a form of education that provides structured and purposeful guidance for learners who are physically separated from the educational institution, using electronic and telecommunication technologies [10].

This study aimed to evaluate the effectiveness of distance learning in delivering advanced training programs in "Hygiene and Sanitation" and "Hygienic Education" to postgraduate paramedics enrolled in a part-time curriculum.

PATIENTS AND METHODS

The study was conducted in 2021–2022 at the East-Siberian Institute of Medical and Ecological Research as part of educational activities. Methodologically, processing of materials on distance learning for postgraduate paramedics in evening advanced training programs involved logical analysis, generalization, and systematization of published information, as well as reflection on digitalization experience.

The study focused on two programs, "Hygiene and sanitation" and "Hygienic education," totaling 144 hours. The sample included 30 students working as general hygiene assistants at Rospotrebnadzor institutions in the Republic of Buryatia and the Irkutsk Region. The mean age of the students was 45.26 years (44.40; 46.13); most of them — 94.7% — were female. Inclusion criteria: secondary vocational education in the specialty 32.02.01 "Therapy and Preventive Medicine"; a specialist certificate in "Hygiene and Sanitation"; and at least five years of relevant work experience.

Upon completion of the training, the students were given the questionnaire shown in Table 1. Its purpose was to collect information to assess the effectiveness of distance learning. The answers were rated on a seven-point scale. Picking an answer from the extreme left part of the questionnaire scored 1 point, selection of one from the extreme right part — 7 points. Points from 2 to 6 were in-between the extreme options, with a neutral standpoint yielding 4 points.

Mathematical processing of the survey results was performed using Microsoft Excel (Microsoft; USA) and Jamovi 2.3 statistical software (The Jamovi Project; Australia). We ranked the results of the survey and calculated the arithmetic mean (M), the standard error of the mean (SEM), and 95% confidence intervals.

RESULTS

The distance learning advanced training program in "Hygiene and Sanitation" included the following sections: maintaining medical records and organizing the work of medical personnel; providing emergency medical care; collecting environmental and food samples for sanitary and hygienic testing; conducting sanitary and epidemiological studies and surveys with instrumental measurements of environmental factors; practical training; and final exams. The program "Hygienic Education" included the following sections: fundamentals of hygiene and epidemiology; promoting a healthy lifestyle; principles of hygienic education; content of hygienic education; organization and delivery of hygienic education; popularization of healthy living in institutions and organizations; practical training; and final examinations. In the practical training component, students independently prepared visual campaign materials — multimedia presentations, posters, flyers, etc. The distance learning concept was realized in the form of video lectures and webinars. The degree of knowledge acquisition was controlled through testing. The students sent the completed tasks and practical projects by e-mail. The quality of the practical part was assessed by several parameters: relevance, aesthetics, practical significance, independence of presentation, creativity and personal contribution, novelty and non-standard thinking in exploration of the subject, formalization rules compliance. The quality of practical work was discussed during in-person classes, which were organized to teach, advise, and analyze mistakes.

The training was supposed to not only give the students subject matter basics and a set of useful skills, but also teach them to perceive and master new knowledge. Education should foster a person's ability to create; the most optimal way to activate a student's creative potential is to teach them to work independently. A proper example of the implementation of this approach are tasks involving preparation of visual agitation — Power Point presentations; the advantages of such tasks are as follows:

– the purpose of the independent work of the students is consistent with the practical necessity;

– the contradictions between the abstract nature of the educational process and the real professional needs are eliminated;

– the acquired knowledge is systematized and attributed to the programs;

– the range of the problems considered is extended, and the depth of their comprehension increased;

– the tasks are consistent with the logic of professional activity, and imply improvement of the social interaction and professional communication skills;

- the students enjoy greater involvement, since independent preparation of visual materials implies feedback that is more meaningful than marks given by automated knowledge verification systems;

- the personal qualities of the students are well reflected in the results, their self-esteem is adjusted, and they acquire their professional activity stereotype;

– the processes of reflection is encouraged, along with those of interpretation and comprehension of the ultimate results.

Having defined the purpose and the task as well as set the conditions of independent work, the teacher gives the general

Table 1. Methodology for evaluating the effectiveness of distance learning

The level of computer skills: insufficient	1	2	3	4	5	6	7	The level of computer skills: professional
Internet skills: lacking	1	2	3	4	5	6	7	Internet skills: professional
It is quite difficult to study using distance learning technologies	1	2	3	4	5	6	7	It is easy to study using distance learning technologies
The information content of the program is insufficient	1	2	3	4	5	6	7	The information content of the program is sufficient
The purpose of our training is unclear	1	2	3	4	5	6	7	The purpose of our training is clear and understood
Essentially, the studying was fruitless for me.	1	2	3	4	5	6	7	The studying was fruitful for me, I will use the updated knowledge in my practical activities
I felt uncomfortable from the beginning to the end of the advanced training	1	2	3	4	5	6	7	Initially, I felt uncomfortable, but then my situation improved
I did not feel confident, like an outsider, from the beginning to the end of the advanced training	1	2	3	4	5	6	7	I felt confident, as a full member of the process, from the beginning to the end of the advanced training
In my opinion, traditional form of education is the most effective	1	2	3	4	5	6	7	In my opinion, distance learning is the most effective form of education
Generally, I find the organization of distance learning unsatisfactory.	1	2	3	4	5	6	7	Generally, I find the organization of distance learning done well.

patterns and procedure for the students. The experience gained by the students while they are preparing their projects should subsequently be used in the practical activities as physician assistants for general hygiene, same as the skills learned in the advanced training program. Preparing the projects, students employ many theoretical and practical approaches. The projects are the final stage of the program; they are offered after the students have mastered the course and updated their knowledge of the hygienic education and general hygiene theory, which are delivered as video lectures posted on the Internet. In addition, preparing the projects, the students relied on the practical experience previously acquired in the context of implementation of preventive measures under Chapter 10 of the Federal Law No. 248-FZ "On State Control (Supervision) and Municipal Control in the Russian Federation" of July 31, 2020 [11]

When the students submitted the filled questionnaires, we calculated the mean scores for all the parameters shown in Table 2.

In the survey ranking, the highest mean score — 6.84 (6.77; 6.91) — was assigned to three questions related to the organization of the advanced training cycle, the clarity of the learning goals, and the content of the program. The mean index of satisfaction with the actual results was 6.63 (6.55; 6.71); the score reflecting how confident and comfortable the students felt during the training — 6.26 (6.17; 6.36) and 5.95 (5.85; 6.04), respectively; the mean score indicating how simple it was for them to use distance learning technology — 5.84 (5.73; 5.95) points. The students rated their mastery of personal computer skills at 5.74 (5.62; 5.86) points and Internet skills at 5.68 (5.59; 5.78) points, respectively. The question that received the lowest mean score concerned the effectiveness of distance learning: 5.37 (5.23; 5.51) points. However, this value was still above the neutral level of 4 points.

DISCUSSION

The problems of digitalization of medical education involve a comprehensive assessment of the ongoing modernization, including the introduction of intelligent information systems and technologies [12, 13]. Many experts [14, 15] have indicated that educators need to revise the classical approaches and teaching methods in order to increase the motivation of students. Computers and the Internet enable training when the student and the teacher are separated by a significant geographical distance. Telecommunications and network technology are quite common in postgraduate education, including that for paramedics.

Distance learning involves the transfer of knowledge through video lessons, which are equivalent to regular lectures or introductory classes [16], but differ in several ways. According to the authors of [17], there are two most widely used forms of distance learning: synchronous (live communication) and asynchronous (text-based process). The first form employs lecture recordings and other information resources that allow the educator and the students to interact in real time.

Table 2. Survey results (points)

Questionnaire items	Arithmetic mean (M)	SEM	95% confidence interval of the arithmetic mean		Rank
			M-(1,96 × SEM)	M+(1,96 × SEM)	
Personal computer skills	5.68	0.05	5.59	5.78	7
Internet skills	5.74	0.06	5.62	5.86	6
Ease of knowledge acquisition using distance learning technologies	5.84	0.06	5.73	5.95	5
The information content of the program	6.84	0.02	6.80	6.88	1
The purpose of the training	6.84	0.02	6.80	6.88	1
The actual result	6.63	0.04	6.55	6.71	2
How comfortable the process was	5.95	0.05	5.85	06.04	4
How confident the students felt	6.26	0.05	6.17	6.36	3
How effective the training was	5.37	0.07	5.23	5.51	8
Organization of distance learning	6.84	0.04	6.77	6.91	1

The second form does not include a live online component but relies on written messages, audio and video posts, and discussions in chats for interactivity. There are many studies demonstrating the benefits of distance learning [18–21]. For example, a systematic review [20] showed that this mode of education delivery is more flexible and accessible. It allows for an academic dialogue between students and educators, offers a convenient learning environment, rich experience, good work-life balance, and easy access to educational materials. Some scholars claim that interactive video is a viable alternative to online learning. Many educational organizations supplement traditional education with online learning [19, 21, 22].

In the case considered in this study, postgraduate paramedics enrolled in the evening advanced training programs "Hygiene and Sanitation" and "Hygienic Education", where they acquired comprehensive theoretical knowledge applicable to their practical work. To learn the subjects, the students relied on various additional resources, which greatly facilitated the preparation process [18]. One of such resources were video materials, which gave information, offered computer-labeled tasks, and involved subsequent testing. The said materials were lectures given by educators to empty audiences; they were stored locally or online, and delivered to the students using various tools and media. Digitalization offers postgraduate trainees a growing array of opportunities and advantages, primarily by allowing them to save time through the ability to watch videos at their convenience.

At the same time, the question about the effectiveness of distance learning received the lowest mean score, which is due to the certain difficulties and problems experienced by the students because of the lack of exchange of opinions and interaction between the educator and the students characteristic of traditional learning. This rationale is consistent with the opinion of a number of researchers [23–25]. Changes in society driven by technological progress entail transformation of postgraduate education and qualification requirements for the State Sanitary and Epidemiological Service specialists: computer and Internet skills are among those they need to master mandatorily. In this regard, some of the advanced training programs prepared for such specialists should cover new software, graphic editors, useful resources and technologies; these programs can be comprised of online courses, video tutorials, and specialized literature.

The last decade's experience of distance learning [26–29] confirms adoption of the basic principles that revolve around active training with an emphasis on deep learning and understanding. The concept passes the responsibility to the students, encourages independent exploration, and draws upon the interdependence between the teacher and the student, mutual respect, and a reflective approach to the learning process practiced by both parties.

CONCLUSIONS

This study has shown that introduction of distance learning into evening advanced training cycles significantly increases motivation to acquire knowledge and allows students to dedicate less time to periodic professional development. It should be noted that the question about the effectiveness of distance learning scored the lowest in the survey, which may be due to insufficient self-discipline or self-control, spending personal rather than working time on studying and assimilating material during business trips to the place of daytime education, etc. Thus, the positive experience of using distance learning once again confirms the need to continue to introduce training programs with mixed forms of education.

References

1. Ukaz Prezidenta Rossijskoj Federacii ot 09 maja 2017 g. № 203 "Strategija razvitija informacionnogo obshhestva v Rossijskoj Federacii (RF) na 2017–2030 gg." (in Rus.).
2. Alroumi F, Belforti R, Villarroel N, Blanchard RD. Curating a media-linked curriculum. Clin Teach. 2024; 21 (3): e13705.
3. McHugh SM, Kheirelseid E, Hyde S, Conway PF. Perceptions of online surgical-focused learning amongst surgeons during the COVID pandemic: A scoping review 2020–22. Surgeon. 2024; 22 (2): e94–9.
4. Ho KC, Huang TS, Lin JC, Chiang HK. The online interactive visual learning improves learning effectiveness and satisfaction of physicians with postgraduate year during the COVID-19 pandemic in Taiwan. BMC Med Educ. 2023; 23 (1): 713.
5. Lazarenko VA, Kaluckij PV, Dremova NB, Ovod AI. Adaptacija vysshego medicinskogo obrazovanija k uslovijam cifrovizacii zdravoohranenija. Vysshee obrazovanie v Rossii. 2020; 29 (1): 105–15 (in Rus.).
6. Tuteljan VA, Nikitjuk DB, Tarmaeva IJu. Formirovanie obshherossijskoj sistemy obrazovanija v oblasti zdorovogo pitanija naselenija. Gigiena i sanitarija. 2023; 102 (10): 1012–8 (in Rus.).
7. Agranovich NV, Hodzhajan AB, Sohach AJa, Shhetinin EV. Distancionnoe obuchenie kak sovremennaja forma obuchenija medicinskih kadrov. Medicinskij vestnik Severnogo Kavkaza. 2012; 26 (2): 90–2 (in Rus.).
8. Smirnov AV. Innovacii v professional'nom obuchenii na osnove klasternogo podhoda. Vestnik UGNTU. Nauka, obrazovanie, jekonomika. Serija: Jekonomika. 2013; 2 (4): 73–6 (in Rus.).
9. Efimova NV, Pankov VA. Opyt ispol'zovanija rolevyh igr v postdiplomnom obrazovanii vrachej-gigienistov. Sibirskij medicinskij zhurnal. 2010; (7): 129–32 (in Rus.).
10. Jankovaja TN, Golovanova ED, Afanasenkova TE, Argunova IA, Iljushhenkov PA. Vozmozhnosti ispol'zovanija innovacionnyh tehnologij v podgotovke vrachej obshhej praktiki (semejnyh vrachej). Smolenskij medicinskij al'manah. 2016; (2): 213–5 (in Rus.).
11. Federal'nyj zakon ot 31 ijulja 2020 g. № 248-FZ "O gosudarstvennom kontrole (nadzore) i municipal'nom kontrole v Rossijskoj Federacii" (in Rus.).
12. Tuteljan VA, Tarmaeva IJu, Kade MA, Nikitjuk DB. Medicina budushhego: rol' iskusstvennogo intellekta v optimizacii pitanija dlja zdorov'esberezhenija naselenija Rossii. Voprosy pitanija. 2024; 93 (4): 6–13 (in Rus.).
13. Healthy, Prosperous Lives for All: The European Health Equity Status Report. Executive Summary. Copenhagen: WHO Regional Office for Europe, 2019; 33 p.
14. Uvarova AJu, Frumina ID, redaktory. Trudnosti i perspektivy cifrovoj transformacii obrazovanija. M.: Izd. dom VShJe, 2019; 343 p. (in Rus.).
15. Roshal JA, Lund S, LHuillier JC, Silvestri C, Woodward JM, Gan C, et al. Out of touch: a nationwide mixed-methods e-learning needs assessment of general surgery residents. J Surg Educ. 2025; 82 (6): 103514.
16. Bettiol S, Psereckis R, MacIntyre K. A perspective of massive open online courses (MOOCs) and public health. Front Public Health. 2022; (10): 1058383.
17. Regmi K, Jones L. A systematic review of the factors — enablers and barriers — affecting e-learning in health sciences education. BMC Med Educ. 2020; 20 (1): 91.
18. Jowsey T, Foster G, Cooper-Ioelu P, Jacobs S. Blended learning via distance in pre-registration nursing education: A scoping review. Nurse Educ Pract. 2020; (44): 102775.

19. Xing W, Ao L, Xiao H, Liang L. Chinese nurses' preferences for and attitudes about e-learning in continuing education: a correlational study. J Contin Educ Nurs. 2020; 51 (2): 87–96.
20. Vakilian A, Ranjbar EZ, Hassanipour M, Ahmadinia H, Hasani H. The effectiveness of virtual interactive video in comparison with online classroom in the stroke topic of theoretical neurology in COVID-19 pandemic. J Educ Health Promot. 2022; (11): 219.
21. Wang J, Jiang Y, Fu X, Gou R, Sun Z, Li G, et al. Evaluating the impact of interactive video-based case-based learning in clinical medical education: a randomized controlled trial. Front Med (Lausanne). 2025; (12): 1556018.
22. Longhini J, Rossettini G, Palese A. Massive open online courses for nurses' and healthcare professionals continuous education: a scoping review. Int Nurs Rev. 2021; 68 (1): 108–21.
23. Chekalina TA, Tumandeeva TV, Maksimenko NV. Osnovnye napravlenija i perspektivy razvitija onlajn-obuchenija. Professional'noe obrazovanie v Rossii i za rubezhom. 2018; (3): 44–52 (in Rus.).
24. Geçer E, Bagci H, Atar C. "Nothing replaces meeting my students at class": analysing academics' views regarding distance education. Educ Inf Technol (Dordr). 2023: 1–22.
25. Crow J, Murray JA. Online distance learning in biomedical sciences: community, belonging and presence. Adv Exp Med Biol. 2020; (1235): 165–78.
26. Alshumrani H, Albagawi B, Villareal S, Areola B Jr, Albaqawi H, Algamdi S, et al. Relation between socio-demographic factors and professionalism among nurses in Saudi Arabia: a comparative analysis. Belitung Nurs J. 2022; 8 (2): 139–46.
27. Mir MM, Mir GM, Raina NT, Mir SM, Mir SM, Miskeen E, et al. Application of artificial intelligence in medical education: current scenario and future perspectives. J Adv Med Educ Prof. 2023; 11 (3): 133–40.
28. Blattner K, Faatoese A, Smith M, Maoate K, Miller R, Richards R. New Zealand postgraduate medical training by distance for Pacific Island country-based general practitioners: a qualitative study. J Prim Health Care. 2022; 14 (1): 74–9.
29. Onggirawan CA, Kho JM, Kartiwa AP, Anderies A, Gunawan AAS. Systematic literature review: the adaptation of distance learning process during the COVID-19 pandemic using virtual educational spaces in metaverse. Procedia Comput Sci. 2023; (216): 274–83.

Литература

1. Указ Президента Российской Федерации от 9 мая 2017 г. № 203 «Стратегия развития информационного общества в Российск ой Федерации (РФ) на 2017–2030 гг.».
2. Alroumi F, Belforti R, Villarroel N, Blanchard RD. Curating a media-linked curriculum. Clin Teach. 2024; 21 (3): e13705.
3. McHugh SM, Kheirelseid E, Hyde S, Conway PF. Perceptions of online surgical-focused learning amongst surgeons during the COVID pandemic: A scoping review 2020–22. Surgeon. 2024; 22 (2): e94–9.
4. Ho KC, Huang TS, Lin JC, Chiang HK. The online interactive visual learning improves learning effectiveness and satisfaction of physicians with postgraduate year during the COVID-19 pandemic in Taiwan. BMC Med Educ. 2023; 23 (1): 713.
5. Лазаренко В. А., Калуцкий П. В., Дремова Н. Б., Овод А. И. Адаптация высшего медицинского образования к условиям цифровизации здравоохранения. Высшее образование в России. 2020; 29 (1): 105–15.
6. Тутельян В. А., Никитюк Д. Б., Тармаева И. Ю. Формирование общероссийской системы образования в области здорового питания населения. Гигиена и санитария. 2023; 102 (10): 1012–8.
7. Агранович Н. В., Ходжаян А. Б., Сохач А. Я., Щетинин Е. В. Дистанционное обучение как современная форма обучения медицинских кадров. Медицинский вестник Северного Кавказа. 2012; 26 (2): 90–2.
8. Смирнов А. В. Инновации в профессиональном обучении на основе кластерного подхода. Вестник УГНТУ. Наука, образование, экономика. Серия: Экономика. 2013; 2 (4): 73–6.
9. Ефимова Н. В., Панков В. А. Опыт использования ролевых игр в постдипломном образовании врачей-гигиенистов. Сибирский медицинский журнал. 2010; (7): 129–32.
10. Янковая Т. Н., Голованова Е. Д., Афанасенкова Т. Е., Аргунова И. А, Ильющенков П. А. Возможности использования инновационных технологий в подготовке врачей общей практики (семейных врачей). Смоленский медицинский альманах. 2016; (2): 213–5.
11. Федеральный закон от 31 июля 2020 г. № 248-ФЗ «О государственном контроле (надзоре) и муниципальном контроле в Российской Федерации».
12. Тутельян В. А., Тармаева И. Ю., Каде М. А., Никитюк Д. Б. Медицина будущего: роль искусственного интеллекта в оптимизации питания для здоровьесбережения населения России. Вопросы питания. 2024; 93 (4): 6–13.
13. Healthy, Prosperous Lives for All: The European Health Equity Status Report. Executive Summary. Copenhagen: WHO Regional Office for Europe, 2019; 33 p.
14. Уварова А. Ю., Фрумина И. Д., редакторы. Трудности и перспективы цифровой трансформации образования. М.: Изд. дом ВШЭ, 2019; 343 с.
15. Roshal JA, Lund S, LHuillier JC, Silvestri C, Woodward JM, Gan C, et al. Out of touch: a nationwide mixed-methods e-learning needs assessment of general surgery residents. J Surg Educ. 2025; 82 (6): 103514.
16. Bettiol S, Psereckis R, MacIntyre K. A perspective of massive open online courses (MOOCs) and public health. Front Public Health. 2022; (10): 1058383.
17. Regmi K, Jones L. A systematic review of the factors — enablers and barriers — affecting e-learning in health sciences education. BMC Med Educ. 2020; 20 (1): 91.
18. Jowsey T, Foster G, Cooper-Ioelu P, Jacobs S. Blended learning via distance in pre-registration nursing education: A scoping review. Nurse Educ Pract. 2020; (44): 102775.
19. Xing W, Ao L, Xiao H, Liang L. Chinese nurses' preferences for and attitudes about e-learning in continuing education: a correlational study. J Contin Educ Nurs. 2020; 51 (2): 87–96.
20. Vakilian A, Ranjbar EZ, Hassanipour M, Ahmadinia H, Hasani H. The effectiveness of virtual interactive video in comparison with online classroom in the stroke topic of theoretical neurology in COVID-19 pandemic. J Educ Health Promot. 2022; (11): 219.
21. Wang J, Jiang Y, Fu X, Gou R, Sun Z, Li G, et al. Evaluating the impact of interactive video-based case-based learning in clinical medical education: a randomized controlled trial. Front Med (Lausanne). 2025; (12): 1556018.
22. Longhini J, Rossettini G, Palese A. Massive open online courses for nurses' and healthcare professionals continuous education: a scoping review. Int Nurs Rev. 2021; 68 (1): 108–21.
23. Чекалина Т. А., Тумандеева Т. В., Максименко Н. В. Основные направления и перспективы развития онлайн-обучения. Профессиональное образование в России и за рубежом. 2018; (3): 44–52.
24. Geçer E, Bagci H, Atar C. "Nothing replaces meeting my students at class": analysing academics' views regarding distance education. Educ Inf Technol (Dordr). 2023: 1–22.
25. Crow J, Murray JA. Online distance learning in biomedical sciences: community, belonging and presence. Adv Exp Med Biol. 2020; (1235): 165–78.
26. Alshumrani H, Albagawi B, Villareal S, Areola B Jr, Albaqawi H, Algamdi S, et al. Relation between socio-demographic factors and professionalism among nurses in Saudi Arabia: a comparative analysis. Belitung Nurs J. 2022; 8 (2): 139–46.
27. Mir MM, Mir GM, Raina NT, Mir SM, Mir SM, Miskeen E, et al. Application of artificial intelligence in medical education: current scenario and future perspectives. J Adv Med Educ Prof. 2023; 11 (3): 133–40.
28. Blattner K, Faatoese A, Smith M, Maoate K, Miller R, Richards R. New Zealand postgraduate medical training by distance for Pacific Island country-based general practitioners: a qualitative study. J Prim Health Care. 2022; 14 (1): 74–9.
29. Onggirawan CA, Kho JM, Kartiwa AP, Anderies A, Gunawan AAS. Systematic literature review: the adaptation of distance learning process during the COVID-19 pandemic using virtual educational spaces in metaverse. Procedia Comput Sci. 2023; (216): 274–83.