

METODICALS RECOMMENDATIONS

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Training and practice-centric method of Professor Sulima

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The paper is concerned with the current state of doctors' training methodologies. Problems of teaching the discipline were identified: inability to memorize the amount of theoretical material, the ineffectiveness of methodological techniques for practical training, amount of new training centers. It has been proven that these faults are risky for mastering learning skills. The method of «see - repeat» preferred by coaches is not a panacea for the effective educational process during various medical interventions. Particular attention is paid to the psychological borders of young doctors in the recollection of new information that is needed to be improved. Objective. Build an innovative methodological strategy that requires a combination: high quality of theoretical medical knowledge and practical skills. Results. Among modern pedagogical techniques, the most profitable is the method of Peyton, which became the base of «Professor's Sulyma training». Detailed instruction of the author's teaching strategy is suggested in the report. This way of education is based on neurobiological research and divided into 10 stages, which are theoretically and methodically described. The authors approbated training and paid attention to its effectiveness. Conclusions. «Professor's Sulyma training» is a method that allows practicing any valuable skills in different medical areas. Key words. Peyton method, medical training, author's methodology, practical skills.

Проаналізовано сучасний стан методології навчання слухачів курсів тематичного удосконалення в медичних ВНЗ. Виявлено такі проблеми викладання дисциплін за спеціальністю, як непосильні для запам'ятовування обсяги теоретичного матеріалу, неефективність методологічних прийомів для занять практичного відпрацювання навичок, незначна кількість нових навчально-тренінгових центрів. Доведено, що ці недоліки не сприяють глибокому засвоєнню хірургічних навичок, а облюбований сучасними викладачами метод «побач — повтори» не є панацеєю для ефективного застосування знань молодих лікарів під час різного роду хірургічних втручань. Звернено особливу увагу на психологічні бар'єри, які виникають унаслідок немінучих енергетичних спустошень у молодих спеціалістів під час вивчення нової інформації, яка є необхідною для кваліфікованого безперервного освітнього розвитку. Мета. Побудова новаторської методологічної стратегії, яка передбачає органічне поєднання вивчення теоретичних аспектів медицини з практичними навичками. Результати. Визначено, що серед сучасних способів навчання найбільш ефективний метод Пейтона, який став основою «Вишколу за методикою професора Сулими». Наведено детальну інструкцію авторської стратегії лікаря ортопеда-травматолога та професора кафедри травматології і ортопедії ІФНМУ В. С. Сулими, яка ґрунтується на нейробіологічних дослідженнях, для засвоєння будь-якої практичної навички. Цей спосіб навчання структурований на 10 етапів, кожен з яких докладно теоретично та методично прокоментовано. Особливу увагу приділено методиці проведення вишколу й аналізу отриманих результатів після його апробації в межах медичного тренінгу під час відпрацювання навички «Двогвинтової цефаломедулярної фіксації проксимального відділу стегнової кістки» за допомогою відповідного інструментарію. Висновки. «Вишкіл за методикою професора Сулими» — загальнонауковий педагогічний метод, що уможливорює відпрацювання будь-якої практичної навички за різними напрямками та ступенем складності. Ключові слова. Метод Реутона, медичний вишкіл, авторська методологія, практичні навички.

Key words. Peyton method, medical training, author's methodology, practical skills

Introduction

Medicine as a branch of scientific and practical activity has always been qualitatively different in the specifics of combining the amount of theoretical material intended for memorization and the corresponding practical development of skills by future physicians [1]. This created significant difficulties for young professionals both in mastering narrowly oriented disciplines of medical specialty for students, and conducting complex surgical procedures [2]. The difficulty in assimilating a significant amount of information for further practical application in both older and younger generations of doctors has a certain psychological resistance to learning something new in medicine, as it a priori requires significant energy costs for an average person.

Each science is a symbiosis of three components that are in a dialectical relationship — theory, practice and methodology [3]. Violation of the last of these elements is the cause of the psychological barrier in novice physicians. The artistic selection of methods and means of learning allows to qualitatively and quickly adapt the necessary information to the characteristics of different types of thinking of students, which gives a possibility to achieve the predicted learning outcomes [4]. All this determines the relevance of our scientific research, which aims to build an innovative methodological strategy that involves an organic combination of the study of theoretical aspects of medicine with practical skills.

It is known that in the world the amount of information per day is about 5 billion searches on Google, and this figure is constantly growing [5]. A doctor who strives for continuous development and, therefore, is in constant search of professional information, which is vital for maintaining and improving the level of any qualification. Such information overload creates the effect of «fake learning» when the brain is unable to perceive excessive amounts of information [6].

Unfortunately, the theoretical component of didactic teaching methods remains leading in higher education, and even more so — not only in medical schools. This traditional approach to teaching is ineffective [7]. The feeling «I know in theory» accompanies the graduate even when he begins his professional career [8]. The lack of skills, which is acutely felt by a young doctor, is the cause of difficulties and professional errors in surgery, which can cause irreparable harm to the patient [9]. That is why, in our opinion, it is so important to deepen the practical orientation of teaching in higher education by creat-

ing educational and training and simulation centers equipped with modern equipment, which should be based on the latest scientific developments and constantly be one step ahead of their routine practical use.

The main way to practice skills in a small number of newly established training centers is the method of «see – repeat». Unfortunately, in modern conditions, this method does not work [10]. One-time reproduction, especially of surgical skills, is insufficient for its confident use in the treatment of the patient, as it creates a risk of error. Neurobiological studies suggest that the transition from short-term to long-term memory takes four weeks, with mandatory repetition. It is during this time that strong connections are formed between the neurons of the brain, which help to reliably master the acquired practical skills, rather than simulating «pretended (superficial) knowledge». Repeated performance has been shown to improve the assimilation of material in long-term memory [11]. This process is primarily due to the fact that the working memory of the brain is expanded by auditory and visual analyzers, which form strong links between gnosis and practice, aimed at performing a perfect professional action.

Material and methods

Among modern methods of teaching, in our opinion, the method developed by surgeon-consultant-traumatologist J. W. Rodney Peyton [12] deserves special attention. The four-stage strategy allows to increase the efficiency of surgical skills by 1.5 times in a short period of time. However, comparative studies show that the effectiveness of the skill according to the method of J. W. Rodney Peyton after 6 months without its constant use in clinical practice, the same as after a single practice by «see – repeat» [13]. This was the impetus for the creation of an author's simulation course called «Training according to the method of Professor Sulyma», which aims to solve these problems of teaching at medical universities and become a basis for practical skills without information overload of the brain. However, a prerequisite for the application of any methodological strategy is a preliminary careful study of the instruction-recommendation to create a «generalized knowledge» of what will happen in school [14].

In order to create a training course that would meet modern requirements aimed at the practical mastery of the latest methods of treatment, 62 scientific sources with information on the methods of conducting master classes were developed. After analyzing all the advantages and disadvantages, we incorporated

knowledge of the neurobiology of human perception and assimilation of information, developed and tested our own methodology. On the example of practicing the surgical skill «Double-screw cephalomedullary fixation of the proximal femur» with the help of appropriate tools, we were able to carefully analyze each of the proposed stages of training, taking into account the duration and intensity of the presentation of various materials (theoretical aspects from scientific sources in combination with correctly selected clinical cases [15] and active involvement of all analysts in the process of mastering the method).

Results and discussion

We provide detailed instructions for the created strategy of modern training for the acquisition of any practical skill with the justification of each of the ten proposed and tested stages.

Some general remarks:

- the number of training participants should not exceed six people [16];
- duration of work — 3 hours with two 15-minute organizational and preparatory breaks, which we propose to carry out every hour [17];
- stages of training in the game format involve the creation of a system of memorization and reproduction of surgical skills [18].

Stage I — «Not yet trained»

Pay attention! During the initial assimilation of the material, neural connections are weak, only beginning to form in the neocortex (Fig. 1). This stage is extremely important because it models the general idea of the subject [20]. If you do not repeat what you

have learned over a period of time, the ties are broken and everything you hear is forgotten. That is why in no case should the first stage of training be neglected, as it is the basis for the formation of future knowledge.

Establishing a tutor-participant connection is important in the first stage. It is to create a preliminary communication in the chat. In this way, the tutor and participants establish a habitual communication for a modern person [21], necessary to fully reveal and erase interpersonal boundaries before training [22]. The following indicators also testify to the natural nature of understanding through social networks: 95 % of developed countries have Internet connections, and 45 % of them are online almost all the time [23]. Established communication with the participants of the training through a convenient online platform for them, allows to send a video with a simulation of the process of thematic skills [24]. When the participant views the video for the first time, the visual analyzer is activated. There is a short-term memory that can hold 4 fragments [25]. It is clear that the participant is not able to learn all the details at once, so the optimal duration of the proposed viewing video cannot exceed 15 minutes [26]. Rhythmic, artistically selected melody that accompanies video frames activates the auditory analyzer, which improves the quality of memory [27].

Stage II — «Meeting»

This is the start stage of offline training. Participants receive handouts, get acquainted with the structure of training, instruction-graphic textbook simulation intervention. Graphic textbook instruction is

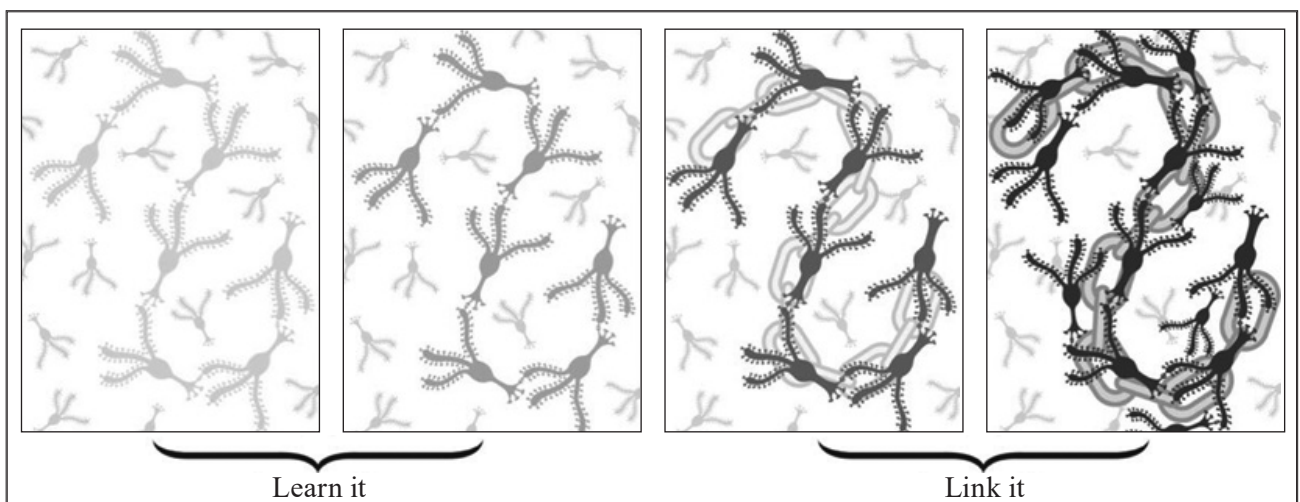


Fig. 1. Adapted from the book «Practical Insights in Brain Science to Help Students Learn» by Barbara Oakley, Beth Rogowsky, Terrence J. Sejnowski [19]. Time course of «new knowledge» formation. The first part of the figure shows the formation of connections between neurons, which occurs during the acquaintance with the material. Practicing the skill on a daily basis leads to the formation of new stable areas in the brain's memory

a mnemonic system of memorization [28]. Detailed visual imaging activates associative thinking, which facilitates rapid search for information in the brain's memory [29]. The instruction does not contain complex words, and, therefore, does not make the participant think about spelling and 90 % facilitates the perception of information.

Stage III — «Acquaintance»

At this stage, the rules of the training are discussed with its participants [30]. The acquaintance takes place in a single format: the tutor takes a small ball and, throwing it in the hands of each listener, offers to answer three questions. In this technique, the ball acts as an activator of attention [31]. Students' answers allow them to get to know each other better, which reduces the level of discomfort during group work. Everyone is free to express their opinion: in this way the barrier between the listener and the trainer-teacher continues to disappear [32, 33].

It is also important that participants report their expectations of the training: adults should understand the purpose of their visit. Her awareness creates a dominant: «I NEED IT», which gradually activates working memory and brain function in general [34].



Fig. 2. Theoretical aspects of training



Fig. 3. Stage of demonstration of practical skills

Stage IV — «Clinical case»

The clinical case is the first step to active learning that stimulates participants to take action. Careful selection of a unique case increases the motivation of students to learn, increases the level of interest in what is happening, provides better memorization and changes in emphasis from theoretical information to the choice of adequate solutions (symbiosis of theory, practice and methodology) [35]. The case should be chosen relevant, extraordinary, revealing, supported by scientific publications, releases, meta-analyzes [36].

Stage V — «Theoretical foundations»

Minilecture is limited to 15 minutes, contains a sample of evidence from published scientific sources. At the present stage of human development, multimedia visualization of the material is a mandatory element of any education. That is why we offer the following recommendations for the presentation [37]:

- black background for slides (allows the speaker to contrast the presented material on the background);
- important is large (everything that needs to be emphasized, should be written in large font);
- contrast in visualization;
- high image quality (inspires confidence in the speaker);
- compliance with all deontological norms.

The speaker's presentation should be somewhat slow and very clear. All important information (accents) in the presentation should be intonationally highlighted for better auditory response of participants [38]. We recommend that the speaker also emphasize the possibility of writing down elements of theoretical information to activate mechanical memory [39]. Visual and auditory analyzers promote the formation of new connections in the listener's brain (Fig. 2).

Stage VI — «Demonstration»

The stage involves passive observation by participants of the reproduction of skills (surgical techniques)



Fig. 4. Stage of re-execution of practical skills

by the tutor (Fig. 3). It is important that participants remember what they saw in the pre-submitted video. Remembrance is one of the most effective learning methods that strengthens the connections between brain neurons [40].

Stage VII — «Reproduction»

«Reproduction» involves repeated performance by the tutor of a simulated surgical intervention with detailed commentary on each action (Fig. 4). The stage activates the visual neural connections and also forces the participant to analyze events in order to be able to formulate at least 15 questions to the tutor. We recommend following the Pomodoro method [41] in regulating the duration of each stage (not more than 30 minutes), as this allows you to switch the concentrated mode of memory to diffuse: to effectively understand and generalize the studied person is distracted [42].

Stage VIII — «Fight-win»

Stage-game with a reward for attentiveness, the essence of which is that the two created competing teams receive tasks in accordance with the theme of the training. The winning team is awarded. Working in groups, which assumes the responsibility of each participant for their own actions to achieve victory, stimulates memory [43]. The excitement that comes with playing is a stressful factor in memorization.

Stage IX — «Perform»

Provides independent individual performance of each of the stages of the skill under the close supervision of the tutor. This part of the training gives confidence in the implementation of practical skills, creates an opportunity to ask questions. The «Perform» stage is extremely important for the self-analysis of the performance of the skill by each participant in particular [44].

Stage X — «Evaluation»

Provides an analysis of the goals discussed in the first stage, with the opportunity to express impressions of the training, to assess its advantages and disadvantages [45]. At this stage, participants receive certificates, they are offered continuous professional support — the path to repetition in the assimilation of training material [46].

Conclusions

Proprietary training method of Professor V. S. Sulyma consists of ten stages, which are based on scientifically proven neurobiological research. The proposed technique allows to increase the efficiency of mastering the practical application of theoretical knowledge, which has been repeatedly tested during the development of complex surgical skills «Double-

screw cephalomedullary fixation of the proximal femur» with the help of appropriate tools. The results of training and analysis of inverse forms eloquently testify to the high quality of the work and a significant increase in motivation to practice the acquired knowledge in the field of medicine according to the method of «Training». Our proposed strategy is not limited to orthopedic surgery, and therefore allows you to practice any practical skills, training in different areas and degrees of complexity. The use of Professor Sulyma's method significantly improves the effectiveness of the skill in clinical practice and is a prospect for the development of further scientific and pedagogical activities.

Conflict of interest. The authors declare no conflict of interest.

References

1. Innovations in medical education / Journal of General Internal Medicine. — 2004. — Vol. 19 (suppl. 1). — P. 83–99. — DOI: 10.1111/j.1525-1497.2004.S1006_2.x.
2. Gill D. Challenges to medical education at a time of physical distancing / D. Gill, C. Whitehead, D. Wondimagegn // The Lancet. — 2020. — Vol. 396 (10244). — P. 77–79. — DOI: 10.1016/S0140-6736(20)31368-4.
3. Dobronravova I. Philosophy and methodology of science / I. Dobronravova, L. Sidorenko. — Kyiv : Kyiv University Publishing and Printing Center, 2008. — 223 p.
4. Oakley B. Learning how to learn / B. Oakley, T. Sejnowski, A. Mcconville. — TarcherPerigee, 2018. — 256 p.
5. Desjardins J. How much data is generated each day? [web source] / J. Desjardins. — Available from : <https://www.weforum.org/agenda/2019/04/how-much-data-is-generated-each-day-cf4bddf29f/>.
6. Carey B. How we learn: Throw out the rule book and unlock your brain's potential / B. Carey. — New York : Random House, 2015. — 272 p.
7. Challa K. Modern techniques of teaching and learning in medical education: a descriptive literature review / K. Challa, A. Sayed, Y. Acharya // MedEdPublish. — 2021. — Vol. 10 (1). — DOI: 10.15694/mep.2021.000018.1.
8. Cowan N. The many faces of working memory and short-term storage / N. Cowan // Psychonomic Bulletin & Review. — 2017. — Vol. 24 (4). — P. 1158–1170. — DOI: 10.3758/s13423-016-1191-6.
9. Hayes S. Restriction of working memory capacity during worry / S. Hayes, C. Hirsch, A. Mathews // Journal of Abnormal Psychology. — 2008. — Vol. 117 (3). — P. 712–717. — DOI: 10.1037/a0012908.
10. Training methods: a review and analysis / B. Ostrowski Martin, K. Kolomito, T. Lam // Human Resource Development Review. — 2013. — Vol. 13 (1). — P. 11–35. — DOI: 10.1177/1534484313497947.
11. Burgoyne A. P. How firm are the foundations of mind-set theory? The claims appear stronger than the evidence / A. P. Burgoyne, D. Z. Hambrick, B. N. Macnamara // Psychological science. — 2020. — Vol. 31 (3). — P. 258–267. — DOI: 10.1177/0956797619897588.
12. Ahmed F. Effect of Payton's four step approach on skill acquisition, self-confidence and self-satisfaction among critical care nursing / F. Ahmed, S. R. Morsi, H. M. Mostafa // Journal of Nursing and Health Science. — 2018. — Vol. 7 (6). — P. 38–47.
13. Sulyma V. Step-by-Step orthopaedics training of simulation

- sskill of osteosynthesis by the method of Peyton / V. Sulyma, R. Bigun // *Orthopedics, Traumatology and Prosthetics*. — 2020. — № 3. — P. 89–92. — DOI: 10.15674/0030-59872020389-92.
14. Oakley B. Mindshift: break through obstacles to learning and discover your hidden potential / B. Oakley. — TarcherPerigee, 2017. — 304 p.
 15. McLean S. F. Case-based learning and its application in medical and health-care fields: A review of worldwide literature / S. F. McLean // *Journal of Medical Education and Curricular Development*. — 2016. — Vol. 3. — DOI: 10.4137/JMECD.S20377.
 16. Wang D.. Research: When Small Teams Are Better Than Big Ones / D. Wang, J. Evans // *Harvard Business Review*. — 2019. — Available from : <https://hbr.org/2019/02/research-when-small-teams-are-better-than-big-ones>.
 17. Anderson Chr. TED Talks: The Official TED Guide to Public Speaking / Anderson Chr. — London: Hodder & Stoughton, 2018. — 288 p.
 18. The effect of video game-based training on postural control during gait initiation in community-dwelling older adults: a randomized controlled trial / R. Khanmohammadi, G. Olyaei, S. Talebian [et al.] // *Disability and Rehabilitation*. — 2021. — Vol. 23. — P. 1–8. DOI: 10.1080/09638288.2021.1925360.
 19. Oakley B. Practical insights in brain science to help students learn / Oakley B., Rogowsky B., Sejnowski T. — Available from : <https://barbaraoakley.com/books/uncommon-sense-teaching>.
 20. Buzsáki G. Neurophysiology of Remembering / G. Buzsáki, S. McKenzie, L. Davachi // *Annual Review of Psychology*. — 2021. — DOI: 10.1146/annurev-psych-021721-110002.
 21. The impact of communication technologies on life and relationship Satisfaction / J. Goodman-Deane, A. Mieczakowska, D. Johnsonb [et al.] // *Computers in Human Behavior*. — 2016. — Vol. 57. — P. 219–229. — DOI: 10.1016/j.chb.2015.11.053.
 22. Albalawi H., Nadeem M. Exploring the Impact of Ineffective Formal Communication between Teachers and Students: A Case Study of Mustaqbal University and Jubail University College, Kingdom of Saudi Arabia / H. Albalawi, M. Nadeem // *English Language Teaching*. — 2020. — Vol. 13 (3). — P. 68–76. — DOI: 10.5539/elt.v13n3p68.
 23. The “online brain”: how the Internet may be changing our cognition: article / J. Firth, J. Torous, B. Stubbs [et al.] // *World Psychiatry*. — 2019. — Vol. 18 (2). — P. 119–129. — DOI: 0.1002/wps.20617.
 24. Wibawa B. The effect of instructional videos on learning performance / Wibawa B., Muhidin A. // *AIP Conference Proceedings*. — 2021. — Vol. 2331 (1). — DOI: 10.1063/5.0041759.
 25. Zlotnik G. Memory: An extended definition / G. Zlotnik, A. Vansintjan // *Frontiers in Psychology*. — 2019. — Vol. 10. — Article ID: 2523. — DOI: 10.3389/fpsyg.2019.02523.
 26. Leveraging recorded mini-lectures to increase student learning [web source] / R. Berg, A. Brand, J. Grant [et al.] — Available from : https://www.csusb.edu/sites/default/files/upload/file/Leveraging_Recorded_Mini-Lectures_to_Inc.pdf.
 27. Zhang Sh. The Positive Influence of Music on the Human Brain / Sh. Zhang // *Journal of Behavioral and Brain Science*. — 2020. — Vol. 10 (1). — P. 95–104. — DOI: 10.4236/jbbs.2020.101005.
 28. Cohn N. Visual narratives and the mind: Comprehension, cognition, and learning / N. Cohn // *Psychology of Learning and Motivation*. — 2019. — Vol. 70. — P. 97–128. — DOI: 10.1016/bs.plm.2019.02.002.
 29. The neural mechanisms of associative memory revisited: fMRI evidence from implicit contingency learning / M. P. Caviezel, C. F. Reichert, D. S. Bahmani // *Frontiers in Psychiatry*. — 2020. — Vol. 10. — Article ID : 1002. — DOI: 10.3389/fpsyg.2019.01002.
 30. Bennett T. The trainee teacher behavioural toolkit: a summary [web source] / T. Bennett. — 2019. — Available from : <https://www.gov.uk/government/publications/initial-teacher-training-itt-core-content-framework/the-trainee-teacher-behavioural-toolkit-a-summary>.
 31. McMorris T. Exercise-Cognition Interaction: Neuroscience Perspectives / T. McMorris. — Elsevier Inc., 2016. — 504 p. — DOI: 10.1016/C2013-0-18937-4.
 32. The influences of emotion on learning and memory / C. M. Tyng, H. U. Amin, M. N. M. Saad, A. S. Malik // *Frontiers in Psychiatry*. — 2017. — Vol. 8. — Article ID: 1454. — DOI: 10.3389/fpsyg.2017.01454.
 33. Dhir H. K. Handbook of Research on Barriers for Teaching 21st-Century Competencies and the Impact of Digitalization / H. K. Dhir. — 2021. — 496 p. — DOI: 10.4018/978-1-7998-6967-2.
 34. Effective Adult Learning A Toolkit for Teaching Adult [web source]. — Available from : http://also-chicago.org/also_site/wp-content/uploads/2019/11/Adult-Education-Toolkit_Updated_022814.pdf.
 35. Scaffolding medical student knowledge and skills: team-based learning (TBL) and case-based learning (CBL) / A. Burgess, E. Matar, C. Roberts [et al.] // *BMC Medical Education*. — 2021. — Vol. 21 (1). — Article ID: 238. — DOI: 10.1186/s12909-021-02638-3.
 36. iCBLs: An interactive case-based learning system for medical education / M. Ali, S. C. Han, H. Bilal [et al.] // *International Journal of Medical Informatics*. — 2018. — Vol. 109. — P. 55–69. — DOI: 10.1016/j.ijmedinf.2017.11.004.
 37. Duarte N. Slide:ology: Nancy Duarte The art and science of creating great presentations / N. Duarte. — California: O'Reilly Media, Inc., 2008. — 296 p.
 38. Sibbet D. Visual meetings: How graphics, sticky notes and idea mapping can transform group productivity / D. Sibbet. — Hoboken, New Jersey, 2010. — 288 p.
 39. Mueller P. A. The pen is mightier than the keyboard: advantages of longhand over laptop / P. A. Mueller, D. M. Oppenheimer // *Psychological Science*. — 2014. — Vol. 25 (6). — P. 1159–1168. — DOI: 10.1177/0956797614524581.
 40. Romani S. Practice makes perfect in memory recall / S. Romani, M. Katkov, M. Tsodyks // *Learning & memory*. — 2016. — Vol. 23 (4). — P. 169–173. — DOI: 10.1101/lm.041178.115.
 41. Wang X Turning time from enemy into an Ally using the Pomodoro Technique / X. Wang, F. Gobbo, M. Lane // *Agility across time and space. Implementing Agile Methods in Global Software Projects* / D. Smitte, N. B. Moe, P. Agerfalk (Eds.). — Springer Verlag, 2010. — Ch. 10. — DOI: 10.1007/978-3-642-12442-6_10.
 42. Oakley B. Learning how to learn how to succeed in school without spending all your time studying; A guide for kids and teens / B. Oakley. — USA : J.P.Tarcher,U.S./Perigee Bks., 2018. — 256 p.
 43. Vogel S. Learning and memory under stress: implications for the classroom. / S. Vogel, L. Schwabe // *NPJ Science of Learning*. — 2016. — Vol. 1. — Article ID : 16011. — DOI: 10.1038/npscilearn.2016.11.
 44. Berry A. The Role of self-study in times of radical change / A. Berry, J. Kitchen // *Studying Teacher Education*. — 2020. — Vol. 16. — P. 123–126. — DOI: 10.1080/17425964.2020.1777763.
 45. Impact of self-assessment by students on their learning / R. Sharma, A. Jain, N. Gupta [et al.] // *International Journal of Applied & Basic Medical Research*. — 2016. — Vol. 6 (3). — P. 226–229. — DOI: 10.4103/2229-516X.186961.
 46. Martin H. J. Improving training impact through effective follow-up: Techniques and their application / H. J. Martin // *Journal of Management Development*. — 2010. — Vol. 29 (6). — P. 520–534. — DOI: 10.1108/02621711011046495.

TRAINING AND PRACTICE-CENTRIC METHOD OF PROFESSOR SULIMA

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