ÖZGÜN ARAŞTIRMA ORIGINAL RESEARCH

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EVIDENCE-BASED MEDICINE COURSE FOR PRE-CLINICAL MEDICAL STUDENTS AND EVALUATION OF THEIR SELF-EFFICACY PERCEPTIONS

KLİNİK ÖNCESİ TIP ÖĞRENCİLERİNE KANITA DAYALI TIP EĞİTİMİ VE ÖZYETERLİK ALGILARININ DEĞERLENDİRİLMESİ

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Öz

Amaç

Bu çalışmada Manisa Celal Bayar Üniversitesi Tıp Fakültesi'nde (MCBÜTF) yeniden yapılandırılarak güncellenen Kanıta Dayalı Tıp (KDT) dersinin ilk iki yıl uygulamasına ilişkin sonuçların paylaşılması amaçlanmıştır.

Gereç ve Yöntem

Kesitsel tarama desenindeki bu araştırmaya MCBÜTF'de 2018-2019 ve 2019-2020 yıllarında Dönem-1'e kayıtlı tüm (n=514) öğrenciler dahil edilmiştir. KDT derslerinin planlamasında genel amaç, yeterlikler ve öğrenme hedefleri belirlenmiştir. Buna göre planlanan dersler, dördü kuramsal, ikisi uygulama olmak üzere toplam 12 saatlik altı oturumda uygulanmıştır. Derslerde kuramsal sunum, küçük gruplarda mobil cihazlar kullanılarak yapılan uygulamalar ve olguya dayalı problem çözümü öğretim yöntemleri kullanılmıştır.KDT dersine ilişkin öğrenci özyeterlik algıları ve geri bildirimleri, Likert tipi ölçekler ile değerlendirilen, yapılandırılmış ve yarı yapılandırılmış maddeler içeren iki ayrı çevrimiçi anket formu ile alınmıştır. KDT ders oturumlarına katılan öğrencilerin yanıtları analiz edilerek raporlanmıştır.

Bulgular

Araştırma anket formlarını Dönem 1 öğrencilerinin %37,94'ü (n=195) yanıtlamıştır. Bu öğrencilerin 172'si (%88,21) KDT ders oturumlarına katıldığını bildirmiştir. Derslere katılan öğrenciler uygulama oturumlarına katılma durumlarına göre kategorize edildiğinde 68 (%39,53) öğrencinin hiçbir uygulama dersine katılmadığı, 104 (%60,47) öğrencinin en az bir uygulama dersine katıldığı belirlenmiştir. Öğrencilerin 91'i (%65,00) derse ayrılan sürenin yeterli olduğunu bildirmiştir. Öğrencilerin KDT dersinin öğrenme hedeflerine ilişkin özyeterlik algısı toplam puan ortalaması 3,41±0,85, en yüksek ortalama değer ise uygulama boyutunda (3,49±1,06) saptanmıştır. Öğrencilerin özyeterlik algılarının uygulama oturumlarına katılan öğrencilerde istatistiksel olarak anlamlı düzeyde yüksek olduğu saptanmıştır. Öğrencilerin derse ilişkin beğenileri tüm başlıklarda yüksek düzeyde saptanmıştır. Öğrencilerin en yararlı yön olarak bildirdikleri ifadelerden "Dersin kapsamı" en sık dile getirilen yanıt (n=86, %56,20) olarak belirlenmiştir.

Sonuç

Bu çalışmada elde edilen bulgular literatür ile uyumlu olduğu görülmüştür. KDT eğitimlerinin erken dönemde başlaması ve tıp eğitimi boyunca sürdürülmesi

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öğrenme kalıcılığını artıracaktır. Olguya dayalı uygulamalar ve mobil cihazlar kullanılmasının öğrencilerin KDT konusunda kendilerini yeterli hissetmelerine önemli etkisi olacaktır.

Anahtar Kelimeler: Kanıta Dayalı Tıp, Mezuniyet Öncesi, Tıp Eğitimi, Klinik Öncesi Tıp Öğrencileri,

Abstract

Objective
This study aims to share the results of the two-year implementation phase of the Evidence-Based Medicine (EBM) course, which was restructured and updated at Manisa Celal Bayar University Faculty of Medicine (MCBUFoM).

Materials and Methods
All (n = 514) students enrolled in Year-1 at MCBUFoM in the academic years of 2018-2019 and 2019-2020 were included in this cross-sectional study. Course goal, competencies and learning objectives were determined and sessions were developed accordingly. This restructured 12-hour course was given in six sessions, four of which were theoretical and two were practical. Lectures, practical exercises using mobile devices in small groups and case-based problem-solving activities were used as instruction methods.Students' self-efficacy perceptions and their feedback regarding the EBM course were collected via two separate online questionnaire forms containing structured and semi-structured items. The responses of the students who attended the EBM course sessions were analyzed and reported.

Results
A total of 195 Year-1 students (37.94%) responded to the survey questionnaires. One hundred seventy-two of these students (88.21%) reported that they attended EBM course sessions. Based on their participation, 68 (39.53%) students have not attended any practical sessions, and 104 (60.47%) students have attended at least one practical session. Ninety-one (65.00%) of the students stated that the time allocated to the course was sufficient.It was revealed that the mean total score of students' self-efficacy perceptions regarding the learning objectives of the EBM course was 3.41 ± 0.85, and the highest mean value was found in application dimension (3.49 ± 1.06). Students' self-efficacy perceptions were found to be significantly higher for the students who attended the practical sessions. Students' level of satisfaction regarding the course was high for all evaluation domains. "The scope of the course" was most frequently (n = 86, 56.20%) reported response as the "most beneficial aspect of the course" by the students.

Conclusions
The findings obtained in this study were found to be compatible with the data reported in the literature. Starting the EBM training early, and continuing them throughout the medical education will increase the permanence of the knowledge acquired. Utilizing case-based clinical problems and mobile devices will have a significant positive impact on students' perception of self-efficacy concerning EBM.

Keywords: Evidence Based Medicine, Undergraduate, Medical Education, Preclinical Medical Students,

Introduction

Evidence-based medicine (EBM) is a systematic approach to ensure that the best evidence available is combined with the clinical experience of a physician as well as with the patient's preferences in a clear, rigorous and logical way, in making decisions about the care of individual patients (1).

The interest in the EBM approach has grown incrementally since it was first developed and promoted by a group of researchers led by Gordon Guyatt from the McMaster University of Canada in 1992 (2,3).

Medical practices prior to the EBM approach can be defined as opinion-based medicine. The opinion-based medical approach is mainly carried out with the use of basic resources as well as a subject-focused literature review, without making a critical evaluation. The clinical decision is made by the group's most experienced physician and is based on the physician's personal experience, clinical intuition, and anecdotal information. On the other hand, a new kind of approach is introduced with the EBM developed in the 1990s. This approach is presented as a form of clinical decision-making procedure that does not emphasize intuition, non-systematic clinical experience, and pathophysiological rationale; but instead, it prioritizes the examination and evaluation of the evidence obtained from clinical researches. EBM approach involves the critical evaluation of the evidence obtained through a literature review that is focusing on a specific problem and is mostly conducted electronically (4).

The full implementation of the EBM approach consists of five stages:

1. To transform the required information (prevention, diagnosis, prognosis, treatment, causality, etc.) into an answerable question,

2. To find the best evidence to answer this question,

3. To critically appraise the obtained evidence in terms of validity (closeness to reality), impact (magnitude of impact) and applicability (usefulness for our clinical practice),

4. To integrate this critical assessment with clinical expertise and the patient's unique (distinctive) biology, values and conditions,

5. To evaluate the effectiveness and efficiency of the steps above, and to look for ways to improve both for the next time (3).

Each stage of the EBM also appears as the knowledge and skills that physicians should acquire or that should be obtained by physicians with an educational perspective. Numerous and various educational activities (lectures, workshops, elective courses, etc.) were included in both undergraduate and postgraduate education programs in order to bring this knowledge and skills to the physicians (5,6).

The concept of EBM has been included in the curricula of many national and international medical schools since its introduction (5). The "Evidence-Based Medicine and Critical Thinking" program was carried out for the first time in Turkey by Ankara University Faculty of Medicine in the 2002-2003 academic years in order to ensure that EBM is used in the clinical decision-making process in Turkish medical schools (7). Besides, while mostly carried out as an elective course in undergraduate programs, some medical schools included EBM training in their curriculum as a compulsory course (5).

Manisa Celal Bayar University Faculty of Medicine began its undergraduate education in the academic year of 1995-1996. The main goal of the MCBUFoM is to train physicians who are equipped with the knowledge, skills, and attitudes that can reduce the health problems in Turkey, by carrying out a high standard curriculum. The first three years of the six year program are pre-clinical period, the next two years are the clerkships, and the last year is the internship period (8).

One of the learning objectives of MCBUFoM curriculum was defined as “acquiring the ability to evaluate, interpret and apply the results of scientific research based on evidence” (8). For this purpose, the EBM course has been included in the first year’s Medical Sciences I and II courses since the 2000-2001 academic years. Recently, MCBUFoM has decided to update and improve the format and the content of the EBM course. Thus, it has been restructured and implemented with a student-centered and practice-oriented approach since the 2018-2019 academic years. The aim of this paper is to present the restructuring of the EBM course and the results of the two-year implementation phase.

Materials and Methods

Research Design And Sampling

In this study with cross-sectional research design, sampling was not applied and all the students (n = 514) enrolled in Year 1 in the academic years of 2018-2019 (n = 258) and 2019-2020 (n = 256) were included in the study.

Planning And Implementing The EBM Course

In the planning phase of the EBM course; course goal, competencies and learning objectives were determined, and the flow of the sessions was shaped accordingly. The main competency of the course was determined as “s/he can decide to apply evidence-based medicine when necessary and go through its steps”. Learning objectives in line with this competency were written using Krathwohl's (9) Revised Bloom's Taxonomy. According to this two-dimensional (knowledge dimension and cognitive process dimension) taxonomy; four remember (factual knowledge), three understand (conceptual knowledge) and five apply (operational knowledge) outcomes were defined (Table 2).

Course sessions were organized in order to achieve these learning objectives. A total of 12-hours course was delivered in six sessions. The first four of the sessions were devoted to the lectures with some practical exercises, and the last two sessions were devoted to the case-based problem-solving applications (Table 1).

Restructured EBM course was held in October-November in the 2018-2019 and 2019-2020 academic years in large groups. Lectures, large group discussions, individual exercises, small groups practical exercises using computer, tablet or smartphones, as well as case-based problem-solving activities are included as instruction methods in the sessions (Figure 1).

Table 1 Course schedule with content and instruction methods.

	Week 1	Week 2	Week 3	Week 4	Week 5 Week 6
Sessions	Evidence-Based Medicine (EBM) (Introduction)	Evidence Pyramid	Formulating Research Question	Access to Information	Access to Medical Evidence
	Theoretical				Practical
Content	EBM: definition, components, application steps.	Evidence pyramid: definition, research methods, levels of evidence.	PICOT: definition, components, define and create questions / problems according to PICOT criteria	Search operators, sources of information, definition of Medical Subject Headings (MeSH), PubMed database search with keywords and MeSH	Formulating research questions through clinical scenarios, deciding on the type of evidence, determining appropriate MeSH and keywords, accessing medical evidence.
Instruction methods	- Lecture - Large group discussions - Individual exercises	- Lecture - Large group discussions - Individual exercises	- Lecture - Large group discussions - Case-based discussions	- Lecture - Large group discussions - Case-based discussions - Access to information via mobile devices	- Large group discussions - Case-based problem-solving - Database search via mobile devices

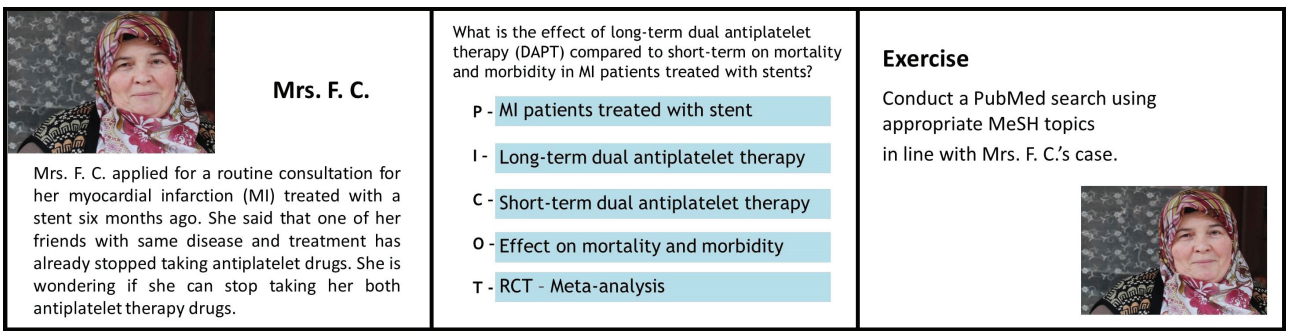

Figure 1
Example of a case-based problem-solving activity.

Table 2 Classification of Learning Objectives (and students' Self-Efficacy Perception Domains) based on two-dimensional taxonomy and descriptive values of students' perception scores (1: Strongly disagree - 5: Strongly agree).

Learning Objectives (Self-Efficacy Perception Domain)	**Cognitive Process Dimension**	**Knowledge Dimension**	**Mean**	**±Standard Deviation**
I can define the concept of EBM.	Remember	Factual knowledge	3.67	1.01
I can list all components of EBM.			3.00	1.14
I can express the meaning of PICOT.			3.42	1.02
I can list two of the Medical Libraries on the Internet.			3.21	1.37
Remember Dimension Mean Score			**3.39**	**1.07**
I can place research/study types on the Evidence Pyramid correctly.	Comprehension	Conceptual knowledge	3.32	1.06
I can express which research/study types in the evidence pyramid are included in which categories (observational/experimental/critical evaluation).			3.32	1.06
I can state the intended use of MeSH cataloging.			3.87	1.34
Comprehension Dimension Mean Score			**3.31**	**0.86**
I can formulate a research question in line with PICOT for a given case.	Application	Operational knowledge	3.45	1.50
I can do a simple search about a case on PubMed.			3.43	1.39
I can use basic Boolean search operators (AND-OR-NOT) correctly while searching on PubMed.			3.78	1.21
I can narrow down the search results on PubMed using the filters (age. gender. and type of research. etc.).			3.30	1.38
I can search for appropriate MeSH topics for the research question on PubMed.			3.19	1.48
Application Dimension Mean Score			**3.49**	**1.06**
EBM Course Self-Efficacy Perception Mean Score			**3.41**	**0.85**

Table 3 T-test results comparing students' self-efficacy perception scores regarding cognitive process dimensions on participation in the EBM course practical sessions.

Self-efficacy Perception in Cognitive Process Dimensions	**Participation in the practical sessions**	**f**	**x̄**	**ss**	**sd**	**t**	**p**	**η^2**
Remember	No	68	2,92	0.84	170	-5.70	< .001	0.16
	Yes	104	3.70	0.90				
Understand	No	68	3.03	0.81	170	-3.50	< .001	0.07
	Yes	104	3.49	0.84				
Apply	No	68	2.85	1.13	109.165	-6.77	< .001	0.24
	Yes	104	3.91	0.79				
Total	No	68	2.92	0.81	170	-6.96	< .001	0.22
	Yes	104	3.73	0.71				

Table 4 Mean and standard deviations of students' (n = 140) evaluations about EBM course. (1: Strongly disagree - 5: Strongly agree).

Evaluation domain	Mean	±Standard Deviation
Sessions were well organized.	4.26	0.83
The initial briefing about the course was sufficient.	4.14	0.99
The instructors were highly motivated.	4.59	0.71
Cases presented in the class helped me learn.	4.24	0.87
Examples solved by the instructors helped me learn.	4.36	0.82
Practice exercises in the class helped me learn.	4.21	1.01
The support provided by instructors was sufficient.	4.27	1.02
Using my phone for the exercises helped me learn.	4.26	1.01
Using my portable computer or having a computer close to me for the exercises helped me learn.	3.66	1.33
I think what I learned in this course will be useful during my medical education.	4.07	1.05
I will utilize what I learned in this course in my professional life.	4.06	0.98
My overall evaluation for EBM course is … (1: very bad - 10: very good)	7.95	1.63

Data Collection and Analysis

Students were asked to fill out two separate online survey questionnaires to evaluate the EBM course. In the first questionnaire (Form-1), students' identity details, gender, and course participation status were inquired. In addition, students were asked to evaluate their self-efficacy perceptions regarding the learning objectives of the EBM course through a Likert type scale (1: Strongly disagree - 5: Strongly agree).

The satisfaction level of the students regarding the EBM course was evaluated anonymously with the second questionnaire (Form-2). This form consists three parts: a) gender and course participation status of the students, b) 14 structured items that seek students' level of satisfaction on; course organization, duration, instructors, cases and practical exercises, and electronic materials and c) three semi-structured open-ended questions to gather participants' opinions. Structured items were asked to be evaluated via Likert-type scales (1: Strongly disagree - 5: Strongly agree, Sufficient-Insufficient-Undecided, 1:Very bad / Useless - 10:Very good / Useful).

The Microsoft Excel program included in Microsoft Office Professional Plus 2010 package, and IBM Statistics SPSS Version 21 were used in data analysis. The responses of the students (n = 172) who reported that they attended the EBM course sessions were analyzed and reported.

The quantitative data are presented with descriptive tables and graphics. Percentage distributions were used for categorical variables, and mean ± standard deviation calculations were used for numerical variables. Levene's Test of Equality of Variances was used to assess the assumption of homogeneity of variance and independent samples t-test is applied for the comparisons. The confidence interval was accepted as 99% and $p < .01$ was considered statistically significant. A thematic analysis is applied to the qualitative data. First, responses from the participants were classified to the themes independently by two researchers, and then researchers discuss the themes and reach to a consensus.

Results

At the end of the courses, 37.94% (n = 195) of Year-1 students, where 105 (53.85%) females and 90 (46.15%) males, responded to Form-1. A total of 172 (88.21%) of these students reported that they attended the EBM course sessions, while 23 (11.79%) of them reported they did not. Among students that have attended the classes, it was revealed that 68 (39.53%) students did not attend any practical sessions, while 104 (60.47%) students attended at least one practical session. Out of 140 respondents, 65.00% (n=91) of the students stated that the time allocated to the course was sufficient, while 10.00% (n = 14) stated that it was insufficient, and 25.00% (n = 35) reported that they are indecisive.

On the evaluations of the students' self-efficacy perceptions; the highest mean score was found on "I can explain the intended use of MeSH cataloging." (3.87±1.34) and the lowest mean score was found on "I can list all components of Evidence-Based Medicine." (3.00 ± 1.14). In addition, the highest taxonomy-dimension mean score of the EBM course was found in the application dimension (3.49 ± 1.06) (Table 2).

An independent samples t-test was conducted to compare the students' self-efficacy perceptions regarding EBM course for taxonomy dimensions and participation in the practical courses. There was a significant difference in students' self-efficacy perceptions total scores ($t_{(170)}$=-6.96; p<0.001; η2=0.22), and remember dimension scores ($t_{(170)}$=-5.70; p<0.001; η2=0.16), and comprehension dimension scores ($t_{(170)}$=-3.50; p<0.001; η2=0.07), and application dimension scores ($t_{(109,165)}$=-6.77; p<0.001; η2=0.24) for participation in the practical sessions or not (Table 3).

The effect sizes of these differences are medium for comprehension dimension and high for all other variables.

A total of 163 (31.71%) students, where 82 (50.31%) females and 81 (49.69%) males, responded to the second questionnaire. One hundred forty of these students (85.89%) reported that they attended EBM courses, whereas 23 (14.11%) of them reported they did not. Students' evaluations regarding the EBM course are given in Table 4.

In the students' evaluations regarding the design and implementation of the course, it was revealed that the highest score was received by the phrase "The instructors were highly motivated." (4.59 ± 0.71), while the lowest score was received by "Using my portable computer or having a computer close to me for the exercises helped me learn." (3.66 ± 1.33) (Table 4).

A total of 153 responses were given by the students to the item "What are the most productive-most useful aspects of the course?". These responses were gathered under four categories which are "Scope of the course" (n = 86, 56.21%), "Instruction methods" (n = 40, 26.14%), "Professional usability" (n = 20, 13.07%) and "Other" (n = 7, 4.58%). Among the 133 responses given to the question "What are the most inefficient-most useless aspects of the course?", the most frequent response was "No inefficient aspect" (n = 76, 57.14%); while the second most frequent responses (n = 10, 7.52%) were classified as the theme "external factors", since it consisted of the expressions written outside the scope of the course.

Discussion

In this study, students' self-efficacy perceptions regarding the EBM course, as well as their evaluations on the overall content and design of the course, were investigated.

With the help of self-assessment, the person can better evaluate his/her acquisitions or changes, compared to an external observer (10). In addition, self-assessment affects the learning styles to be used in the future, enabling the individual to determine the impact and contribution of the methods s/he has followed in the learning process (11). It was determined that self-efficacy perceptions regarding EBM which were revealed via students' self-evaluations were above the mean value, and this perception was significantly higher for the students who participated in the practical sessions. It is also in line with the expectations that the students were highly satisfied with the course. Students stated the scope of the course as the most efficient-most useful feature of the course.

In the literature, some studies have shown that the EBM training given in the first three years of undergraduate medical education has positive effects on the students in terms of knowledge, skills, and attitudes; and that the students were pleased with it. It was shown that the 16-hour EBM training given by Bennett et al. (12) to the small groups during early years of medical education improved students' critical assessment skills, compared to the control group. In the study conducted in 1994, Landry gave two interactive seminars on EBM to students during the core clerkships and observed that students' knowledge and attitudes had improved, while the use of medical literature in their written assignments had not. Similarly, Dragan Ilic et al. (13) reported that teaching EBM-related skills in pre-clinical years and reinforcing them in the clinical years would make it easier for students to use their EBM skills in their clinical practice, as well as increasing students' confidence. In our study, EBM training was successfully applied in the pre-clinical period of the medical school curriculum, and students' reactions were positive. Moreover, Yogesh Acharya et al. (14) reported that the introduction of EBM in the pre-clinical years had a positive effect on students, and equipped them with the ability to critically comprehend and appraise new researches and innovations in the field of medicine.

Ghali (15) demonstrated that the four-session interactive, case-discussing, EBM mini-course with a concurrent evidence-access application given to third-year medical students further improved students' self-efficacy perceptions regarding their skills and attitudes; compared to the didactic EBM course of the same amount of time. Similarly, in our study, the students stated that the duration of EBM education applied with a similar structure was sufficient and the scope of the course was the most beneficial aspect of the course. In the study of the e-learning approach regarding the effective review of MEDLINE, Schilling et al. (16) showed that students' self-confidence with regards to making literature review in accordance with the EBM practice criteria, and to accessing information has increased. These findings were found to be consistent with our study in which the students who participated in the practical sessions reported statistically significantly high self-efficacy perception. This can be interpreted as that the case-based problem-solving practices increase students' self efficacy perception.

In a study conducted by Davis, Crabb, Rogers, Zamora, and Khan (17), it was shown that a computer-based EBM session led to a similar knowledge and attitude acquisition, compared to a presentation based session. In this study, it is also argued that providing EBM education via information technologies can be effective in helping medical students achieve their learning goals. In our study, students appreciated the use of mobile devices in practical sessions. It is believed that it contributes positively to the students' degree of learning and knowledge. West et al. (18) reported that the longitudinal EBM training program contributed to a significant increase in the students' level of knowledge. Nieman et. al. (19) also reported that learning about the EBM process made the students more aware and more realistic about their self-efficacy. Similarly, in our study, students reported that their levels of self-efficacy regarding their learning goals were above average.

Srinivasan et al. (20) showed that the majority of the medical students had liked the EBM classes given in the 1st-year curriculum, and had thought that it had been related to the clinical practice. Sastre et al. (21) reported that 3rd-year medical students have given positive feedback to EBM training. Moreover, Mustafa İlhan et al. (22) reported that the evaluations of the students regarding the duration, content and overall ratings of the EBM practical were positive and these increased as they progressed from Year-1 to Year-4. In our study, students level of satisfaction regarding the course was found to be high for all evaluation domains. In addition, the reports of students presented in the study of Sastre et al. (21) stating that they found it useful to learn EBM and felt that they would use the skills they acquired in their clinical practice were also found in our study.

Conclusion

Evidence-Based Medicine is essential for providing information to the medical students with regards to formulating appropriate research questions, recognizing different research types and reviewing the literature, as well as for motivating them for deep learning. Providing the EBM training in the early period – as of the first year of medical education– and integrate it vertically will increase the permanence of learning. The enrichment of the course with case-based exercises will contribute greatly to the ability of the students to integrate the clinical sciences with their current knowledge. The use of up-to-date technologies and mobile devices in practical sessions will make an important contribution to the students' self-efficacy perception with regards to reaching the course objectives. All these suggestions will make a significant contribution to the students in terms of both being prepared for professional life, and increasing their willingness and ability to access information and use it in their professional practices.

References

1. Sackett DL, Rosenberg WMC, Gray JAM, Haynes RB, Richardson WS. Evidence based medicine: what it is and what it isn't. BMJ [Internet]. 1996 [cited 2019 Feb 6];312(7023):71 LP - 72. Available from: http://www.bmj.com/content/312/7023/71.abstract
2. Guyatt G, Cairns J, Churchill D, Cook D, Haynes B, Hirsh J, et al. Evidence-Based Medicine. JAMA [Internet]. 1992 [cited 2019 Feb 6];268(17):2420. Available from: http://jama.jamanetwork.com/article.aspx?doi=10.1001/jama.1992.03490170092032
3. Straus SE, Sackett DL. Evidence-based medicine: how to practice and teach EBM. 2005.
4. Yılmaz E, Çöl M. Evidence Based Medicine. J Clin Anal Med [Internet]. 2014 [cited 2019 Feb 7];5(6):537–79. Available from: http://www.jcam.com.tr/files/KATD-1847.pdf
5. Finkel ML, Brown H-A, Gerber LM, Supino PG. Teaching evidence-based medicine to medical students. Med Teach [Internet]. 2003 [cited 2019 Feb 6];25(2):202–4. Available from: http://www.tandfonline.com/doi/full/10.1080/01421590310000092634
6. Kahveci R, Özyiğit F. Training Methods to Improve Evidence-Based Medicine Skills. TAF Prev Med Bull. 2010;9(3):245–54.
7. Saygılı M, Kaya S, Sonğur C, Özer Ö. Family physician's evidence based medicine applications and information searching behaviours. SDÜ Sağlık Bilim Enstitüsü Dergisi [Internet]. 2013 [cited 2019 Feb 7];4(13):104–10. Available from: http://dergipark.gov.tr/download/article-file/196025
8. Manisa Celal Bayar Üniversitesi. Tıp Fakültesi Eğitim Öğretim Rehberi [Internet]. [cited 2019 Feb 7]. Available from: http://tip.mcbu.edu.tr/mezuniyet-oncesi-egitim/egitim-ogretim-rehberi.156.tr.html

9. Krathwohl DR. A revision of bloom's taxonomy: An overview [Internet]. Theory into Practice. 2002 [cited 2020 Jan 11];41:212–8. Available from: https://www.tandfonline.com/action/journalInformation?journalCode=htip20
10. Shrauger JS, Osberg TM. The relative accuracy of self-predictions and judgments by others in psychological assessment. Psychol Bull. 1981;90(2):322.
11. Dochy FJRC, McDowell L. Introduction: Assessment as a Tool for Learning. Stud Educ Eval. 1997;23(4):279–98.
12. Bennett KJ, Sackett DL, Haynes RB, Neufeld VR, Tugwell P, Roberts R. A Controlled Trial of Teaching Critical Appraisal of the Clinical Literature to Medical Students. JAMA J Am Med Assoc. 1987;257(18):2451–4.
13. Ilic D, Maloney S. Methods of teaching medical trainees evidence-based medicine: a systematic review. Med Educ [Internet]. 2014 Feb 1 [cited 2019 Feb 6];48(2):124–35. Available from: http://doi.wiley.com/10.1111/medu.12288
14. Acharya Y, Raghavendra Rao M V, Arja S. Evidence-based medicine in pre-clinical years: a study of early introduction and usefulness. J Adv Med Educ Prof [Internet]. 2017;5(3):95–100. Available from: http://www.ncbi.nlm.nih.gov/pubmed/28761882%0Ahttp://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=PMC5522909
15. Ghali WA, Saitz R, Eskew AH, Gupta M, Quan H, Hershman WY. Successful teaching in evidence-based medicine. Med Educ [Internet]. 2000 [cited 2020 Jan 31];34(1):18–22. Available from: http://doi.wiley.com/10.1046/j.1365-2923.2000.00402.x
16. Schilling K, Wiecha J, Polineni D, Khalil S. An Interactive Web-based Curriculum on Evidence-based Medicine: Design and Effectiveness [Internet]. 2006 [cited 2020 Jan 31]. Available from: https://pubmed.ncbi.nlm.nih.gov/16450235/
17. Davis J, Crabb S, Rogers E, Zamora J, Khan K. Computer-based teaching is as good as face to face lecture-based teaching of evidence based medicine: a randomized controlled trial. 2008 [cited 2020 Jan 31];30:302–7. Available from: https://doi.org/10.1080/01421590701784349
18. West CP, Jaeger TM, McDonald FS. Extended evaluation of a longitudinal medical school evidence-based medicine curriculum. J Gen Intern Med. 2011;26(6):611–5.
19. Nieman LZ, Cheng L, Foxhall LE. Teaching first-year medical students to apply evidence-based practices to patient care. Fam Med. 2009;41(5):332-336.
20. Srinivasan M, Weiner M, Breitfeld PP, Brahmi F, Dickerson KL, Weiner G. Early Introduction of an Evidence-based Medicine Course to. Intern Med [Internet]. 2000 [cited 2019 Jan 11]:58–65. Available from: https://link.springer.com/content/pdf/10.1046%2Fj.1525-1497.2002.10121.x.pdf
21. Sastre EA, Denny JC, McCoy JA, McCoy AB, Spickard A. Teaching evidence-based medicine: Impact on students' literature use and inpatient clinical documentation. Med Teach [Internet]. 2011 [cited 2020 Feb 21];33(6):306-12. Available from: http://www.ncbi.nlm.nih.gov/pubmed/21609166
22. İlhan M, Maral İ, Güney Z, Haznedaroğlu Ş, Çakır N, Tunaoğlu F, Sözen S, Dursun A. Gazi Üniversitesi Tıp Fakültesinde Kanıta Dayalı Tıp Eğitimi: İlk Yıl Deneyimi. Tıp Eğitimi Dünyası. 2007; 50-46.