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# Effectiveness of ethics case based on blended learning approaches on medical students' learning: A quasi-experimental study

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## Abstract:

**BACKGROUND:** The use of active teaching methods in ethics education, instead of being merely teacher centred, can lead students to problem-solving in a practical way. Therefore, this study was conducted with the aim of comprehensive medical ethics education based on educational approaches and the effect of this approach on students' learning and moral reasoning skills.

**MATERIALS AND METHODS:** This quasi-experimental intervention study was performed on seventy physiopathology medical students who had taken the medical ethics course. The students' educational program included teaching theoretical concept of medical ethics, discussing ethical cases and clinical reasoning in class, and then discussing in forum environment and individual assignments in the learning management system (LMS) system and completing the portfolio. Student evaluation was associated students' knowledge, attitude, and moral reasoning skills and learning. A comprehensive program including forum participation, individual assignments in LMS, theory and objective structured clinical examination (OSCE) tests, and portfolio completion was used to evaluation of students. The students' learning was compared to students of the previous year, which was conducted through a traditional teacher-centered method. Data analysis was conducted using IBM® SPSS® Statistics 21 at two levels of descriptive statistics and analytic statistics.

**RESULTS:** The results showed that there was a significant difference between the mean learning of students compared with traditional class ( $P < 0.05$ ). Furthermore, comparison of students' practical scores through the OSCE test showed its impact on changing students' knowledge, attitude, and performance in moral reasoning.

**CONCLUSION:** According to research findings, it seems that the mentioned model is one of the important and new issues as a suitable method of teaching medical ethics. Furthermore, it can be suitable model in other medical courses. The more research in multicentral may be need to assess other effects on students' learning indicators.

## Keywords:

Active learning, blended learning, case-based study, flex model, medical education, medical ethics, professionalism

## Introduction

Teaching ethics is one of the important issues in medical school curricula and the teacher usually try to prepare students for problem-solving in a complex environment in future professional life, who

is capable and committed to community health.<sup>[1-3]</sup> In the new millennium, increasing public expectations for the quality of care have made the traditional style of education challenged and unable to meet new needs and is changing rapidly.<sup>[4]</sup>

The use of active and student-centered teaching methods in ethics education, instead

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of being merely educational and teacher-centered, can lead students to problem-solving in a practical way. On the other hand, combining the teaching of concepts, beliefs, scientific principles, ethical values, and professional responsibility with ethical principles, can help students to acquire professional responsibility skills.<sup>[5]</sup> To achieve this goal, teachers use different learning strategies and teaching methods with new theoretical foundations. One of the new approaches in teaching and learning medical ethics is blended and case-based education. In a blended learning situation, teachers should use a multiplicity of tools and technologies to facilitate and inspire, interaction, communication, collaboration, and knowledge construction and sharing among the students. Furthermore, the blended learning atmosphere has the characteristics to support, adjust, and facilitate applying constructivism and cognitivist theories in the teaching and learning process.<sup>[6-8]</sup>

Constructivism theory is established on the great idea with learners construct their individual knowledge through their different experiences. The efficiency of constructivism is that it makes ready students for problem solvers in a complex environment.<sup>[6]</sup> The important role of the teacher in constructivism theory is to try to understand how students interpret knowledge and to guide and help them to refine their understanding and interpretations to correct any misconception that arises between students at an early stage and improve learned knowledge quality, especially when using case-based learning (CBL). CBL has emerged in its current denomination as a central teaching. Tool in science and medical education, exhibiting key features advocated by educational teachers.<sup>[9]</sup>

The case-based discussion behind a case presentation is a generally used method of teaching ethics in medicine. In this approach, the case may be cooperatively discussed by students, in peer-assisted learning and be directed by a tutor in a traditional educational setting or, in an attractive e-learning setting, take place. In this method, the student encourages to take advantage of exposed medical and real problems to enhance and develop analytical skills. Hence, the learner is motivated to not only acquire knowledge, but also capable for obtain new knowledge, and the teacher has a facilitating role in education. That can be one of the important methods in the development of moral reasoning.<sup>[10]</sup>

Studies show that medical ethics is formally applied to students on a large scale throughout the course but most do not see it as moral responsibility. This means that students have passed ethics course offered to them, but when providing clinical services, there is no change in their ethical reasoning and behaviors.<sup>[11-16]</sup>

The study of students who generally do not receive adequate training in medical ethics and the limited training provided does not prepare them to face the ethical challenges of clinical settings.<sup>[16,17]</sup>

Lack of a uniform and agreed curriculum in each of universities of medical sciences, according to their ability, regarding the content of medical ethics education, has led to the neglect of many essential features to effectively present the course of medical ethics.<sup>[15]</sup>

This study consequently undertook a comprehensive approach for teaching medical ethics. These comprehensive approaches include group discussions in forums, group discussion with real cases and clinical cases, and completing a portfolio of individual performance during the course. The study designed to evaluate the effectiveness of ethics case based on blended learning approaches on medical students' learning.

## Materials and Methods

### Study participants and sampling

This study is a quasi-experimental study, in which medical students in two courses of physiopathology of Jahrom University of Medical Sciences who take the course of medical ethics (70 people) participated by census. Necessary permits were obtained from the Ethics Committee of the Vice Chancellor for Research of Shiraz University of Medical Sciences.

### Study design and setting

In this study, at first, the method of teaching ethics was explained based on the teaching process and expressing expectations from the student in the curriculum. In this regard, how to work in the forum, how to apply principles of ethical interpretation and models to discuss a group of ethical issues, and how to form a portfolio and its objectives.

Then, questions were designed to examine the level of knowledge and reasoning of students in forum environment by presenting five case issues, to create sensitivity to ethical issues and intellectual background and were placed in the forum on the university LMs. Students were required to present their views on issues. The questions were taught daily in the forum for up to a week (one question per day) before main topics started.

The number of questions was 5 and was designed for 5 days. In this program, the student first answers the questions individually. At the end of individual response time, he would look at the answers of other peers. This provided the ground for the development of moral sensitivity and then rethinking of learners.

Then, after teaching the course, the titles are determined in order by a team of professors of the different departments of clinical and basic sciences. Main concepts concluded fundamentals of medical ethics and principles, ethics in psychiatry, physician–patient communication, end-of-life care, confidentiality and truth-telling, ethical considerations of beginning and ending life, medical errors, ethics in medical education, review of decision-making methods in ethical challenges, etc., were taught.

Teaching was from main references text in medical ethic and biomedical ethic.

In the next step, after the provided trainings, in parallel with the taught concepts, a collection of forty clinical cases on ethical issues was provided to students. So that both could discuss their case and discuss with others in a class. In addition, each student must interpret a case of ethics in their portfolio and individually explain their understanding of ethics.

In the student discussion section of the forum, five scenarios with ethical topics and corresponding to the titles were included; and students study ethical issues as a group and demonstrated their level of reasoning on the issues at hand.

Furthermore, the student portfolio, including the discussion and interpretation of an ethical case/ interpretation of an ethical article/and student’s perception of teaching set conducted in the field of ethical principles, was completed [Diagram 1].

### Data collection tool and technique

In the first phase, the students’ knowledge was assessed by a multiple choice question examination. Questions of which were considered by the lecturers according to the standard questions in examination bank. These questions acquired the level of standard through examination before.

A week after the written examination, the objective structured clinical examination (OSCE) test was conducted, and stations were designed with a combination of ethical reasoning skills in the form of ethical problems, including 12 stations consisting of 11 individual stations and a team station (OSCE). Individual sector stations covered cases such as (confidentiality, news, false testimony, sharia rules, and obtaining informed consent) and then a team station of clinical decision-making. Each of 11 individual stations examined ethical reasoning due to educational objectives. Eleven standardized patients and 11 evaluators were used in each station and separate evaluators participated in examination. In the OSCE test, every 11 people made a decision in a team examination in the final station and the station score belongs to all

group members. Validity of the OSCE test was explained through the opinion of experts from ethics teachers.

Also agreed on items such as minimum acceptable score and weight for each station/ compilation of standard items and acceptable minimum pass level acquired by Angoff method of standard setting (adjusted Angoff). In order to improve the reliability of the examination, an attempt was made to have a sufficient number of OSCE stations and to be able to examination their knowledge, attitude, and practice about the ethical clinical case. Furthermore, checklist used in previous years and its standard was examined before examinations.

Their level of knowledge, attitude, and performance was also assessed as a measure of students’ learning through the OSCE test. Students’ learning rate through their theory scores was compared with previous year (traditional group) theory scores to examine the change in their learning and knowledge in the course. All questions were similar in two groups.

Traditional group consisted of students who had completed a course in medical ethics previous year and received only the written examination (multiple choice questions) and OSCE as a measurement criterion.

Thus, an objective and comprehensive examination from OSCE was performed to assess the status of student moral reasoning at different levels of knowledge, attitude, and practice. All stations were repeated in previous years due to their validity and reliability, the existence of national OSCE tests standard questions.

The conducted OSCE test in the latest station also assessed the team’s skills based on an ethical model and in a challenging issue that requires team decision-making. The issue discussed the allocation of resources in acute situation and urgency of the intensive care unit.

Each student was required to complete his/her portfolio by presenting a daily summary, a critique of an ethical issue (case presented) individually, and a review of an article from one of the journal ethics and history in the past 2 years.

The total final scores of the students were 20 points, including 8 OSCE test scores, 2 portfolio scores, 8 written examination scores (Multiple Choice questions), and a maximum of 2 scores for forum participation and student discussion in the forum.

The following skills were measured in the set of stations:

- Communicating appropriately with nonsick

- clients (duration 5 min – 6 points)
- Keeping patients’ secrets as a trust (duration 5 min – 6 points)
- Knowing the cases allowed to reveal patients’ secrets and how (duration 5 min - 6 points)
- Diagnosis of bad news and its severity (duration 5 min - 6 points)
- The amount of information to be provided to the patient and the recognition of exceptions (duration 5 min - 6 points)
- How to provide bad news with respect to the psychological condition and patient capacity (duration 5 min - 6 points)
- Get to know the person or people with whom you can bring bad news (duration 5 min – 6 points)
- Establish proper communication with the patient at the time of unrealistic or illegal requests (duration 5 min - 5 points)
- Ability to resist wrong and illegal requests and self-restraint from committing criminal acts (duration 5 min - 6 points)
- Communicating appropriately with heterosexual patients (duration 5 min - 6 points)
- Respect for the patient’s cultural and religious values (duration 5 min - 6 points)
- Attention to religious issues (duration 5 min - 6 points)
- Communicating properly with hospitalized patient (duration 5 min – 6 points).

Obtaining informed and free consent by providing appropriate information about the risks and benefits of prescribed medical action (duration 5 min – 12 points).

Proper expression and understanding of the situation to the patient (duration 5 min – 6 points).

Respect for patient autonomy in choosing a physician, treatment method and place of treatment (duration 5 min – 6 points).

Team decision-making skills and critical thinking at a short time (duration 5 min – 6 points).

All the phases that were done in 1<sup>st</sup> year were repeated in the 2<sup>nd</sup> year and contributed to the validity and reliability of the examination and created a valuable bank of OSCE in similar comprehensive examination. The OSCE test also examines team skills based on an ethical model and in a challenging issue that requires team decision-making.

Ethical considerations such as assuring the research units about the confidentiality of information and explanation about the anonymity of students’ score were obtained.

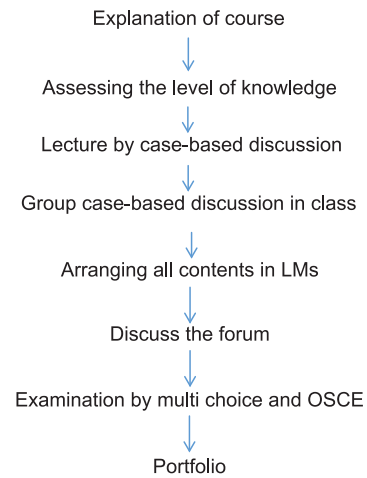


Diagram 1: Stages of study

The intervention diagram can be justified as follows:

### Ethical consideration

All participants in the program were justified for teaching process. All students enter to educational activity by their personal desire. Furthermore, students’ information was kept confidential.

### Results

Seventy medical students in two courses of physiopathology of Jahrom University of Medical Sciences participated in the study by census and 67.1% of them were girls and the rest were boys.

Table 1 shows the effect of comprehensive ethics education based on student-centered educational approaches on students’ learning and performance. The average score of students in the total score of ethics course in the new group (17.82) was improved compared to the traditional group (13.57). The results of Mann–Whitney test showed that the total score of students’ ethics course in the new group was significant compared to the traditional group ( $P = 0.001$ ). This result shows that comprehensive ethics education based on student-centered educational approaches affects the overall score of students’ ethics course.

The average score of students in OSCE test of ethics course in the new group (6.86) was improved compared to the traditional group (6.65). The results of independent  $t$ -test showed that the OSCE test score of students in the new group was significant compared to the traditional group ( $P = 0.001$ ). This result shows that comprehensive education of ethics is influenced by student-based learning approaches on students’ OSCE test.

**Table 1: The effect of comprehensive ethics education based on student-centered educational approaches on student's learning and performance**

	Intervention group (n=72)		Traditional group (n=70)		Statistic	P
	Mean	SD	Mean	SD		
Written exam (8 point)	7.23	0.43	6.92	0.74	-2.714	0.048*
OSCE (8 point)	6.86	0.46	6.65	0.49	2.65	0.001*
Discussing in forum environment and individual assignments (2 point)	1.68	0.59	-	-	-	-
Portfolio (2 point)	2	-	-	-	-	-
Total score of ethics course	17.82	0.97	13.57	0.92	-10.25	0.001**

\*T-test, \*\*Mann-Whitney. SD=Standard deviation, OSCE=Objective structured clinical examination

This result shows that comprehensive ethics education based on student-centered educational approaches has an impact on students' written examination.

## Discussion

The results of data analysis in relation to the purpose of the research indicate that comprehensive ethics education based on student-centered educational approaches has a direct impact on overall score of ethics students.

On the other hand, the written score of students in the intervention group was significant compared to the traditional group.

Lack of a uniform and agreed curriculum in each of universities of medical sciences has led to the neglect of many essential features to effectively present the course of medical ethics.<sup>[15]</sup>

Until now, little attention has been given the use of student-centered and peer-learning approaches to learning.<sup>[18]</sup>

It should be noted that traditional evaluation methods, in addition to not being appropriate for educational goals, do not have the necessary efficiency to measure students' clinical skills and performance and do not provide the necessary assurance for the qualifications of the students for the instructors.<sup>[19]</sup>

Recent research showed that comprehensive training in ethics based on student-centered educational approaches has strengthened the level of knowledge and reasoning of students, as well as the attitude and skills of students in the field of medical ethics.

In line with the results of the present study, Meng *et al.* have considered the use of new student-centered approaches such as self-study sessions, examination questions and discussions using rethinking, peer discussion, and active learning in comparison with traditional methods to improve learning and performance of pharmacy students.<sup>[20]</sup>

Self-directed CECs can have positive effects on participatory practice and clinical reasoning when implemented in a supporting environment but the chance of success depends on the context of use.

Using peer learning in forum-based blended learning effects on students' knowledge, and practice in ethical course. Other research confirmed this results as a peer-learning activities could be essential to providing high-quality medical training in education.<sup>[18]</sup>

Findings of Schonfeld and Spetman have considered passing ethics course to be effective in performance in students' written examinations.<sup>[21]</sup>

In this study, the intervention through blended learning based on clinical cases as a student-centered approach had an effect on students' knowledge, attitude, and performance. Furthermore, this approach has positive impact in students; self-regulation, and self-direction.

Various studies show that the use of students-centered methods has a significant effect on improving their learning and self-regulation skills. This method, while influencing learning, has an important role in students' rethinking through interactions. Furthermore, blended learning has positive impact on students' learning and performance.

Najafi in his study showed blended learning with combination of strengths of both traditional education and e-learning (blended learning) can improve mental visualization, self-regulation, motivation, and learning in students and affect the quality of learning.<sup>[22]</sup>

On the other hand, Wu and Li in corona pandemic have introduced the use of e-learning technologies as a basis for the development of blended learning but, in this process, special learning problems such as insufficient motivation of students to learn autonomously in e-learning should be given special attention.<sup>[23]</sup>

The results show that new method of teaching as a case based by constructive approach can play an effective role on enhancing people' knowledge.<sup>[24-29]</sup>

Other researches indicate the effect of blended learning and cognitive characteristics. Furthermore, it indicates a positive effect on components of individual learning such as document style and students' personality, learning motivation and critical thinking.<sup>[26,30]</sup>

In the research, the blended learning approach was effective on students' knowledge, attitude, and learning, and in line with the above research, confirms the results. Evidence shows that using e-learning has enhanced students' learning, skills and abilities, also students' clinical practice and students' learning indicators.<sup>[18-20,22,23,30]</sup>

### Limitation and suggestion

One of the limitations of this study is that it can be done in two groups and in one university centered. It needs to be examined in order to confirm and further its impact on the indicators of education and learning. One of the limitations of this study was that it was a single group and the implementation of this educational intervention was limited. We suggest this study run from other universities in multicenter. Furthermore, it should be assess more effect of this program on students.

### Conclusion

Effective medical ethics education provides tangible and significant opportunities to achieve medical goals. According to findings of the present study, comprehensive ethics education based on student-centered educational approaches has an impact on students' learning. Therefore, it seems that the mentioned model is one of the important and new issues that are less discussed in our country and can be considered as a suitable method of teaching medical ethics. Furthermore, it can be suitable model in other medical courses. The more research in multicentral may be need to assess other effects on students' learning indicators.

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### Conflicts of interest

There are no conflicts of interest.

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