

## The Impact of Student-Centered Pedagogy on Training in a Pediatrics Course

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### **Abstract**

#### **Introduction**

The most important change in medical education is a shift from didactic teacher-centered and subject-based teaching to the use of interactive, problem-based, student-centered learning. Student-centered approach is a teaching approach that encompasses replacing lectures with active learning, integrating self-paced learning programs and cooperative group situations, ultimately holding the student responsible for his own advances in education. This study aimed to determine the attitudes of students towards learning method based on problem solving as a student-centered and their satisfaction from the student-centered learning method in the medical students of Mashhad University of Medical Science.

#### **Materials and Methods**

This was a descriptive cross-sectional study. In total, 47 M.Sc. students of health (11 male and 36 female) was selected to participate in this study. We used convenience and purposeful sampling strategies. Data collection tools included an 8-items questionnaire to evaluate the student-centered approach in the course of disease in children. The questions were on a 5-point Likert scale ranging from never to more times.

#### **Results**

In total, 11 males and 36 females participated in this study. The results of this study showed that there was a significant difference in the score of participation in the course of pediatric ( $t=8.86$ ) ( $p<0.0001$ ), the knowledge of the participants of this course in the other university ( $t=4.5$ ) ( $p<0.0001$ ), the confidence is presented by students ( $t=9.14$ ) ( $p<0.0001$ ), the suitability of student-centered approach ( $t=5.65$ ) ( $p<0.0001$ ). However, there was no significant difference in the score of usefulness of the student-centered approach ( $t=0.58$ ) ( $p=0.56$ ). Also there was a significant difference in the score of interest in teaching by using student-centered approach ( $t=2.31$ ) ( $p=0.025$ ). The other results showed that the students preference the teacher-centered than the student-centered approach ( $t=2.54$ ) ( $p=0.014$ ).

#### **Conclusion**

Most studies comparing didactic teacher-centered and subject-based teaching showed that the majority of students interested to the traditional method of teaching. However, there is Evidence of increasing use of student-centered teaching style.

**Keywords:** Course, Pedagogy, Pediatrics, Student centered, Training.

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## Introduction

Medical education is an evolving process and requires that both students and teachers to continuously update their knowledge. One of the most important changes in medical education is change in training method from subject-based which is called teacher-centered to student-centered learning which is problem solving-based. Most medical school curricula have turned to new methods of teaching and learning (1).

It seems that providing information about styles of learning to students and teachers is useful and makes the ability for the teacher to provide training in accordance with the learning styles of their students. Also, students' awareness of their learning styles may teach them the ability to identify and use the unique style of learning techniques, thus leading to more educational satisfaction (2).

Student-centered learning is an extensive training approach including replacing lecture with active learning, integration of self-centered programs, or group collaboration and ultimately take the responsibility for progress by the student. Student-centered learning environment has the advantage rather than teacher-centered approach because people are able to provide complementary and interactive activities. In this way, people will be able to more understand the subject and content. In student-centered learning environment, the main focus is on knowledge sharing and when learning is used properly, it can become a lifelong learning process. In this way, the student is looking for a solution to solve the problem without complete dependence to a coach (3).

In teacher-centered classroom, the strategies may be used, such as lectures and class discussion, while in the students-centered classroom, the methods such as

cooperative learning or research are used, in which students produce the questions. This approach also leads to finding fundamental information and possible solutions of the questions including in the debate based on the inquiry (4). In a student-centered learning environment, students are able to perform complex functions such as finding and retrieving the information from a complex conceptual framework, interact with the social environment for providing the knowledge, and in control of their own learning through reflection (5).

Education National Standards Science emphasizes on the need for student-centered classrooms as a tool for effective implementation of inquiry in science education standards. In national training program, it is expected to enable teachers to design classrooms where the students assume responsibility for their work (5).

Implementation of a student-centered method has the barriers such as confusion in the cases of implementation and lack of comfort with it. Since training design of student-centered classroom is more unpredictable than teacher-centered classrooms, teachers need support in the design of classes. In addition, many students have little experience about the skills and knowledge needed to successful learning in the student-centered classroom (4). Due to the changes in global perspective about teaching methods and trends from teacher-centered to student-centered learning, and also, considering the importance of contextual and long-lasting learning of medical science, this study was performed aimed to evaluate the students' attitude toward training method based on problem solving as a student-centered method and their satisfaction from the studied method in the students of Mashhad University of Medical Sciences during two years 2011 and 2012 in two same classes of pediatrics health course.

## Materials and Methods

This study was a descriptive, cross-sectional study. The study population consisted of all M.Sc. students of health, Mashhad University of Medical Sciences who had been taught for the course of "Pediatrics' diseases" during 2011 and 2012. Overall, 47 cases (11 males and 36 females) were selected to participate in this study. The study populations were M.Sc. students of health who were taught for the course of "Pediatrics' diseases" at the same two separate terms and the conditions were quite similar and repetitive held by same professor. In this study, sampling method was purposive-based and available sampling.

Data collection tools consisted of a questionnaire containing 8 questions regarding the teaching method of the course of "Pediatrics' diseases" as students' participation in the teaching process. The questionnaire was designed based on 5 rank Likert scale ranges from very high to never. The content of the questions included presence in the classroom, the rate of knowledge of offering this lesson by other universities, the opportunity of providing the lessons through conferences, tendency to use training-based method in other lessons, believing to the futility of student-centered method, using this method if they want to teach and preferring this method to teacher-centered approach. Validity of the questions in this study was confirmed by specialists.

Data was collected by the questionnaire in the classes of medical courses in a semester. Initially, the students were given the questionnaires and then, needed description on how to implement the plan and purpose of the study were clarified. The data were entered into SPSS software version 16. The mean and standard deviation for each of the questions were evaluated, at the end, T test was used for analysis of data significance.

## Results

Among 47 participants in this study, 11 were males and 36 females. Gender distribution of the participants in this study is shown in (Figure.1). The first question was about the presence or absence of students in the classroom of pediatrics' diseases with teaching-based method. Totally, 12, 23 and 11 students had selected the options of very high, high and moderate. While, only one student rarely had participated in the class of discussion by students and all the students had participated in this class at least once. The second question was about the knowledge of students of providing this course with this method was at other universities. Totally, four students had complete knowledge of this course at other universities and colleges and 20 students reported high knowledge. Nineteen students reported moderate knowledge and 4 low knowledge. However, none of the students were unaware of this course in other universities.

The third question was about the opportunities of students for offering conference in the classrooms. In answer to this question, 13 students stated that they had complete opportunity to present a conference in university classes, and 23 students stated that opportunity was high. 10 students stated that opportunity was moderate and 1 student stated low opportunity. However, none of the students state that they never had the opportunity to take courses as conference.

In answer to the fourth question of "I believe that this method is more suitable for teaching some lessons", 8 students knew this method as a better method, and 22 students assessed that the appropriateness of this approach is high for offering some lessons and 14 students assessed this rate as moderate. However, only 2 of them believed that this method is rarely appropriate to provide some

university courses. One student believed that this method is not suitable for providing any of the courses.

The fifth question assessed the rate of being this method as tedious. To answer this question, five participants assessed this method as quite tedious, and 11 participants as boring to some extent. 13 participants believed that averagely this method is boring, while 10 participants assessed the rate of boring as moderate, and only 8 students were against that this method is boring.

The sixth question assessed the possibility of using this method by students. In answer to this question, 4 students believed that if they want to teach, they only use of this method, and 24 students assessed the rate of using this method high, 11 students as moderate. Also, 2 students stated that they will rarely use this approach for teaching and 6 students believed that they never will use this method for teaching.

In answer to the last question "Generally, I prefer the traditional method of training by the professor", 5 students were quite advocate of traditional method, and 14 students stated their interest of traditional method as high and 21 students as moderate. However, 6 students liked the traditional method very low and only one student does not like it.

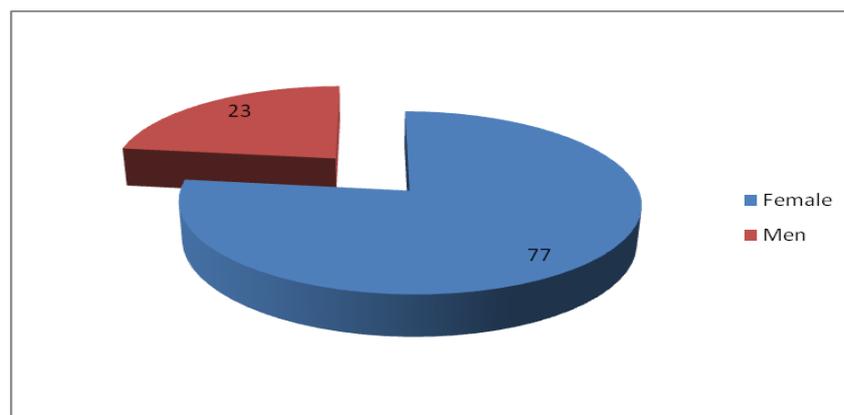
Among 11 men participated in the study, 2 men somewhat liked traditional approach (high), 9 men didn't accept the traditional method (low or rarely) and five men believed they had high opportunity to offer the course as a conference, while 6 men had low or rarely opportunity to offer the course as a conference or they never had this opportunity. Totally, about a third of the boys emphasized mainly on controlling the students according to the references to

avoid providing non-useful and non-documented subjects. Description of survey about student-centered teaching and learning method in teaching basic sciences are detailed in (Table.1).

Based on the results of first question of the questionnaire, mean and standard deviation of the rate of students' participation in the class of providing discussions by students was  $3.97 \pm 0.76$ . The results showed that due to  $t=8.76$ ,  $P<0.0001$ , there was a significant difference between the answers of the subjects. This means that the rate of participation in this class was significantly higher than non-participation in this class. Mean and standard deviation of the knowledge of the participants about providing this course in other universities was  $3.51 \pm 0.77$ .

Evaluation of other results showed that regarding to  $t=4.5$ , the knowledge of the participants about providing this course in other universities was also significant ( $P<0.0001$ ). Mean and standard deviation of offering conference by the student was  $4.02 \pm 0.76$  which according to  $t=9.14$ , it was significant ( $P<0.0001$ ). Mean and standard deviation of the fourth question was  $3.72 \pm 0.87$  which according to  $t=9.14$ , this result was significant ( $P<0.0001$ ).

Mean and standard deviation of the usefulness of training-based method in the perspective of the students was  $2.89 \pm 1.25$  which the difference was not statistically significant ( $t= -0.58$ ,  $P=0.56$ ). Also, mean and standard deviation of students' answers to to seventh question was  $3.38 \pm 1.13$  which according to  $t=2.31$ , this result was statistically significant ( $P=0.025$ ). Mean and standard deviation of students' answers to the last question was  $3.34 \pm 0.91$  that based on the results of the analysis of  $t$ , it was significant ( $t=2.54$ ,  $P=0.014$ ).



**Figure 1:** Gender distribution (Percent)

**Table 1:** Description of the survey of student-centered teaching and learning method in training of the course of pediatrics

Questions	Never	Rarely	Moderate	High	Very high
Question 1	0	1	11	23	12
Question 2	0	4	19	20	4
Question 3	0	1	10	23	13
Question 4	1	2	14	22	8
Question 5	8	10	13	11	5
Question 6	6	2	11	24	4
Question 7	1	6	21	14	5

Q1: Are students presence or absence in the classroom of pediatrics' diseases with teaching-based method?

Q2: How much is the amount of knowledge in students of providing this course with this method was at other universities?

Q3: The opportunities of students for offering conference in the classrooms.

Q4: I believe that this method is more suitable for teaching some lessons.

Q5: Assessed of the rate of being this method as tedious.

Q6: Assessed the possibility of using this method by students.

Q7: Generally, I prefer the traditional method of training by the professor.

## Discussion

Based on the results of this study, the rate of students' participation in class of providing discussions by students and also the rate of participants' knowledge of providing this course in other universities was significantly higher than non-participation in this class and unawareness of its existence. The rate of opportunity for offering conference by the students was significantly suitable.

Also, student-centered approach was evaluated significantly better than traditional methods for some courses. Other results were that the majority of students believed that if they want to teach, they will use student-centered teaching method for teaching. Most students didn't state this method non-useless or boring; however, most of them totally liked offering the classes as traditional.

To approve our study, the study of Mahmoodi et al. aimed to compare different approaches of teacher-centered and student-centered in teaching the embryology course to the students of Yasouj University of Medical Sciences was performed. Their findings showed that students were more willing to be taught the embryology course by the teacher alone. Although, there was no significant difference between the scores of students in teacher-centered and student-centered approaches in teaching embryology course, and there was no preference in educational approaches used in the scores of students (6).

Despite the gap between the interests of students to teaching with traditional methods and more effectiveness of modern methods of training, the study of Memarian suggested that student-centered methods have a significant advantage rather than teacher-centered traditional methods that is visible in cases such as faster learning with more persistence, deeper understanding of the material, application of critical thinking or creative problem-solving skills and causing positive attitude to what is being taught (7).

The study of Peters was a case study of the beliefs of science teacher of seventh grade, decisions for planning, implementing, and student reactions toward the student-centered approach that was evaluated in the genetics course for four weeks. The findings showed that creating interaction in the classroom environment, students' reaction to the new environment and solving problem between teachers and students lead to more effectiveness of student-centered approach (5).

The study of Abdyazdan aimed to compare two teaching methods of student-centered and teacher-centered showed that students' satisfaction was significantly higher in student-centered approach. Also, the

students' confidence was higher, but this difference was not significant (8).

Jafri et al. performed a study aimed to compare teaching skills of residents and teachers based on Problem-based learning (PBL) sessions. The findings of the study showed that in 33 sessions of problem-based learning, the majority of teachers emphasized on Knowledge base-content learning (KBL) and Group skills (GS). There was no significant difference in the scores of professors and residents in student-centered approach and problem-based learning approach. However, the overall score of faculty members was significantly different with residents. The results of the study showed that residents can be considered as the teaching supplement of faculty members in the field of problem-based approach (9).

Case study of De Jong et al. compared the traditional, face-to-face, classroom-based learning method with asynchronously teaching methods and online teaching in two sets of students based on problem-solving learning model. The results of the study showed that asynchronous online teaching was severely approved by the students who had the responsibilities of life and job. Online teaching enabled the students to successfully manage and continue professional development effectively without the need for more time at work and without affecting the quality of the learning experience (10).

Saleh et al. performed a study aimed to evaluate teaching methods available in Iraq Havlr Medical School in the perspectives of staff and the rate of acknowledge of teaching staff about student-centered teaching. The results showed considerable problems in the existing teaching methods including a large number of students in the lecture hall, focus on teacher-centered training and the lack of infrastructures and facilities for suitable teaching. He suggested the priority

for improving the quality of teaching methods including strategies for teaching small groups in all years of the study, improving infrastructures and facilities for teaching in colleges and providing continuous development program for teaching staff (11).

Also, Tian and his colleagues also studied 229 students of second year at military medical university. The students were divided into two groups. A group of students were trained using Virtual medical microscopic system (VM) and the other group using Light microscopy (LM) method. Overall, the findings of this study showed that the test scores of students in the VM group found a significant improvement compared with LM group. Therefore, use of VM system would improve the efficiency and productivity of students' learning. Other positive effects of VM system are critical thinking, facilitating communication and confidence (12).

The study of O'Callaghan that aimed to more attention to the role of emotions in medical education and providing health care indicated that explicit and clear strategies to deal with the hidden curriculum leads to a change in individual function and the health care environment that potentially will lead to improved health and learning (13).

The study of Palmer and Devitt also more than two consecutive years evaluated the medical students by tools of genetic assessment. In that study, two different strategies was used for engaging students in the teaching process. Results showed significant improvement in the scores of students. According to the study, valuable learning source is able to provide timely feedback, formation and stimulating of student-centered learning. However, the production of qualified content is a time-consuming task and suitable strategies

should be used to ensure its effectiveness (14).

Aarnio and colleagues studied the help to the teacher about training and especially how to help students to resolve concept conflicts. The study consisted of four sessions on problem solving in 33 first year medical and dental students. The results showed that in general, teachers often confirm what students say or interfere them in training with cross-sectional explaining and stimulate students to develop their knowledge with rarely proposing question. Therefore, teachers' training should focus on promoting teacher's understanding in the time of direct response and how to encourage students to participate in conflicting ideas (15).

Groves and colleagues showed that qualified clinical teachers use of their science significantly better than non-clinical teachers and behave with their students more empathic. Also, faculty members more emphasize on the evaluation than non-faculty members. Also, they had more skill in creating and maintaining a working environment based on problem solving. Overall, the results indicated that the subject knowledge and the process of facilitating skills is essential separately for teachers (16).

Azer et al. in a study described the development and implementation of four Integrated laboratory classes (ILCs) at King Saud Medicine University College. In answer to this question "Are the main concepts in proposed these classes taught or not?", the findings showed that the main concepts covered in this class had been learned and memorized. Also, most students have a positive attitude towards work on tasks and application of learned knowledge and felt that performing laboratory procedures and interpretation of laboratory findings is a valuable method for learning (17).

Aghamolaei and colleagues evaluated medical students' perceptions of their learning environment in Hormozgan University of Medical Sciences. Although the findings didn't show significant differences between male and female students in the subscale of learning environment, but there was a significant difference between the students of basic science and pathophysiology and clinical course in terms of the understanding of learning, self-perceived, and learning environment. In general, the learning environment was assessed as moderate by most participants (18).

### Conclusion

Most studies in the field of comparing traditional teaching methods and student-centered approach in medical science indicate that most students tend to the traditional method. However, evidence indicates increasing use of student-centered teaching styles. Some studies also show more effect and priority of student-centered approach on student learning. This indicates that there is need to a student-centered learning environment, but in practice, its application is trouble-some.

**Conflict of interests:** None

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