



The Status of Creative Teaching in Medical Classes and Solutions for Its Promotion

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Abstract

Background: Nowadays, creativity is emphasized in different aspects of teaching and learning. Different educational conditions, such as coronavirus disease 2019 (COVID-19), have directed attention to this issue.

Objectives: The current study was an attempt to investigate creative teaching behaviors in medical classrooms and propose solutions for its promotion.

Methods: This mixed-method study was conducted at the Iran University of Medical Sciences, Tehran, Iran (2020 - 2021). It was conducted in two phases, including quantitative (to determine the status quo) and qualitative (to provide solutions for its promotion). In the quantitative phase, 168 students were selected by simple random sampling. The data collection instrument was a standard creative teaching questionnaire. The qualitative phase included semi-structured interviews. The data were analyzed using qualitative content analysis and parametric tests.

Results: The mean scores of creative teachings in higher-grade classes were significantly higher ($P=0.001$). The highest mean score was reported for the fourth year (204.6 ± 0.58). The fourth-year students also had the highest mean scores in each component compared to other years. Except for the freedom component, the highest score was related to the third-year students (21.42 ± 0.89). In the qualitative phase, the strategies were classified into two categories: Developing software factors (3 subcategories) and upgrading and developing hardware factors (2 subcategories).

Conclusions: According to the current study, a creative class will provide an appropriate environment for fostering creativity in students. Therefore, the use of appropriate instructional designs and motivational models that are compatible with the educational environment can be a suitable strategy.

Keywords: Teaching, Education, Medical, Undergraduate, Creativity

1. Background

Nowadays, universities are institutions that play a major role in the education of the young generation, thinking processes, mental skills, learning styles, and social transformations (1). This requires innovative actions from all teachers to the rapid changes in the education system in the twenty-first century (2). Thus, the methods applied to the teaching and learning of different medical subjects differ from the past. These new methods try to make the students think and cooperate in

decision-making and problem-solving by facing probable future problems (3). Moreover, teachers in healthcare schools need to teach materials creatively to help students, meet the demands of the healthcare market, and improve the quality of teaching and learning (4, 5). Creativity in teaching is important for educational conditions and situations. For example, with the emergence of coronavirus disease 2019 (COVID-19), many educational systems have shifted from face-to-face to virtual or blended learning (6). During this time, creative teachers and students played an important role in adaptively

managing the challenges. Therefore, the need for teachers to use creative teaching behaviors was more prominent than ever (7, 8).

Creativity is defined as a desirable attribute, a key educational goal, and a necessary skill of the twenty-first century (9, 10). Recently, creativity has been emphasized in the official curriculum of many countries (10).

Various definitions have been proposed for creativity. In general, it is defined as human potential, the ability to create new ideas, efficiency, and meta-competency (11). The four features of creative teaching are ownership, innovation, control, and relevance, as proposed by Woods (1990). Ownership refers to the teacher demonstrating autonomy by taking responsibility for all aspects of the learning process (12). The most important factor in creative learning is the teacher's role. Teachers can well form the educational environment. Thus, the quality of the teacher's performance is the key element of creative learning (13).

Innovation refers to the teacher's original and imaginative approaches (12). In today's world, traditional education methods do not help the growth of creativity in students. Therefore, professors must create an appropriate atmosphere in classrooms and use new teaching methods and creativity-promoting models (1).

Control refers to how the class is controlled, which is shared with learners, and the teacher and student often act as co-participants in learning. Relevance is the teacher's responsiveness to students' learning needs (12). Furthermore, an educational environment that consists of a set of attitudes, behaviors, and emotions is also effective in innovation and efficiency (1). Learner engagement, physical environment, and learning climate are three key areas for supporting student creativity (14).

Many studies have been conducted on creativity and creative teaching. Some of these studies have demonstrated the importance of faculty members' development for creativity (15, 16). Several studies have also focused on student creativity, its fostering methods, and factors affecting it (17, 18). Some studies have focused on educational factors and the relationship between them and creativity. A positive relationship has also been shown between creativity, learning, and academic achievement. A creative approach provides the opportunity for students to engage with new attitudes and share and receive feedback (19).

A review of Iranian studies on creativity shows that most of them have examined the current situation (20, 21). For example, Mohebi Amin et al. reported that according to the students of the Mashhad Nursing and Midwifery Faculty, professors expressed an acceptable level of creativity in teaching (22). Some studies have also

examined creative teaching from the perspective of faculty members. Meanwhile, it is necessary to examine this issue from the perspective of students as the main stakeholders of educational services (23).

2. Objectives

Studies have mainly focused on schools, and there are few academic studies; specifically, medical schools require more attention due to their special nature. In medical sciences, most studies have examined nursing and midwifery (22). The authors' search yielded no article that specifically focused on basic medical science classes. Therefore, the present study aims to investigate creative teaching behaviors in medical classrooms and provide solutions for its promotion.

3. Methods

3.1. Study Design and Sampling

Since this study aimed to investigate the current situation and propose strategies based on the students' viewpoints, it adopted a mixed-method approach and was conducted in qualitative and quantitative phases. This study was conducted at the Iran University of Medical Sciences, Tehran, Iran (2020 - 2021).

The population comprised medical students. Iranian medical program includes basic, preclinical, and clinical sciences periods. The sample included basic sciences and medical students. The basic sciences period lasts 4 years. The inclusion criterion was undergraduate medical students who had completed at least 3 months of their course. The participants' unwillingness to participate was the exclusion criterion.

In the quantitative phase, by visiting the education department of the medical school, information was obtained about the number of students in each grade by sex. Then, the number of students in each grade was determined according to the size of the population, such that the ratio of students in each grade to the study population was kept in mind. The students in each grade were selected by simple random sampling. The sample size was calculated based on the main objective of the study (mean estimation) and using the information from a previous study (21), using the following formula: $Z(1-\alpha/2): 1.96, \delta: 18.713, d: 0.1 \rightarrow n: 135$. The authors distributed 168 questionnaires, taking into account the probability of sample attrition (25%). Purposive sampling with maximum variation in terms of educational grade, sex, and age was used in the qualitative phase.

3.2. Data Collection

In the quantitative phase, the data collection instrument was a standard creative teaching questionnaire. It was developed by Mohebi Amin et al. to study the status of creative teaching from the viewpoint of students. They used the 10 components of Ekvall's creative atmosphere to design this questionnaire. Cronbach's alpha of the questionnaire was estimated at 0.85 (22). In the current study, Cronbach's alpha of the questionnaire was 0.83. Content validity was determined quantitatively by using the content validity ratio (CVR) and content validity index (CVI). The researchers requested 10 experts (who had a PhD in medical education) to survey each component in terms of its necessity, clarity, and relevance. When the number of experts is 10, a minimum CVR of 0.62 is required based on Lawshe's table. The CVR of all the components was greater than 0.62, and their CVI was also greater than 71%.

This questionnaire contains 55 items, categorized into 10 components: Challenge (8 items), freedom (6 items), supporting the ideas (6 items), trust and confidence (11 items), discussion (6 items), conflict (5 items), risk-taking (4 items), spending time on the ideas (4 items), vitality and dynamism (3 items), and happiness (2 items). The items are scored on a 5-point Likert scale (1 = strongly disagree, 5 = strongly agree). The minimum and maximum scores of the questionnaire are 55 and 275, respectively.

Scores of 55 - 91 show a low level of creativity in teaching.

Scores of 91 - 183 indicate a medium level of creativity in teaching.

Scores above 183 express a high level of creativity in teaching.

Before data collection, the proposal was approved, and permission was obtained from the Ethics Committee of the said university (IR.IJUMS.REC.1398.1153). All the methods were performed in accordance with the approved proposal. The research goal and the interview procedure were described to the participants to observe ethical considerations, and they were informed that they could withdraw from the study at any time.

In the qualitative phase, data collection was performed by semi-structured interviews. Before each interview, an information sheet was given to the participants, and their informed consent was secured. As requested by the participants and based on their convenience, the interviews were conducted on the phone or using virtual networks (WhatsApp and Skype). Every telephone and virtual interview lasted for 35 - 45 minutes on average. The open-ended interview questions were designed by the research team after a review of the literature, the quantitative data, and consulting field experts. The

interviews continued until data saturation. The questions included the following:

What is the concept of creative teaching?

Is creative teaching necessary for medical sciences? Why?

Please describe your experiences of the faculty members' creative teaching behaviors in your classroom.

Probing questions were also posed when necessary:

What solutions/strategies have professors used to promote creativity in their teaching?

Please provide further explanation.

3.3. Data Analysis

The interviews were analyzed by conventional content analysis. In this method, the categories are directly extracted from the text. For this purpose, after each interview, participants' recorded statements were repeatedly listened and their statements were transcribed verbatim. Then, the recorded statements were matched with the transcribed statements to promote the accuracy of the recorded data. Next, formulated meanings were specified for these statements, and the relevant codes were extracted and assigned to subcategories based on their common properties. Finally, categories emerged by merging similar subcategories.

The trustworthiness of this research was ensured based on the four criteria of credibility, dependability, confirmability, and transferability. Member checks and triangulation were used to ensure credibility. For confirmability, dependability, and transferability, the following items were performed: Allocating sufficient and appropriate time to interviews, using an appropriate sample based on the aim of the study, recording and implementing data accurately, and having experts review the codes and themes extracted (peer checks).

In the quantitative phase, data analysis was performed by descriptive statistics (such as frequency distribution, mean, standard deviation, (SD)) and inferential statistics (such as the analysis of variance (ANOVA)) in SPSS v. 16 (SPSS Inc., Chicago, IL, USA).

4. Results

The results are presented in two parts: Quantitative and qualitative.

4.1. Quantitative Findings

In this research, 168 questionnaires were filled out. The students' average age was 22 years; most of them were male and third-year students (Table 1).

Table 1. The Participants' Demographic Information

Variables	Frequency (%)
Sex	
Male	96 (0.87)
female	72 (0.43)
Academic year/grade	
1	26 (0.15)
2	59 (0.35)
3	67 (0.40)
4	16 (0.10)

In general, the mean score of most of the components was reported higher in the fourth year than in other years. Except for the freedom component, the mean score in the third year (21.42 ± 0.89) was higher than the other years.

Based on the results of the data normality test, the variables had a normal distribution ($P > 0.05$). Therefore, parametric tests were used to test the hypotheses (Table 2).

Based on the comparison of the mean scores of creative teaching in different years, the highest mean belonged to the fourth year. According to the ANOVA results, there was a significant difference in the status of creative teaching in terms of the students' grades ($P < 0.001$; Table 3).

4.2. Qualitative Findings

Data saturation occurred after 16 interviews. The participants were 9 women (56%) and 7 men (44%). Among them, 2 were first-year, 3 were second-year, 6 were third-year, and 5 were fourth-year students (Table 4).

From the students' viewpoint, various factors affected the faculty members' creativity in teaching; these factors led to the difference between the classes of different departments and even the faculty members of the same department. According to Table 5, 28 open codes, 5 subcategories, and 2 categories were recognized for promoting creative teaching in medical basic sciences (Table 5).

The interviewees greatly focused on the software and hardware factors affecting creative teaching behaviors. They believed that the skills and individual abilities of faculty members, as well as the skills and individual abilities of students in the classroom, strongly affect creative teaching behaviors. Cultural and emotional support can also facilitate this process.

Some participants spoke about the impact of hardware factors on teacher creativity. They emphasized that factors such as class size and space could influence the use of creative teaching methods. Faculty members have tried to address these problems by using strategies such as

devoting more time to students' learning outside the classroom. Examples of this claim can be found in the following statements made by the participants.

4.3. Sample Statements of the Participants

P6) "In my opinion, creative teaching involves the use of new teaching techniques. A teacher must be first familiarized with these methods efficiently in order to use them in a classroom."

P1) "In my opinion, creative teaching methods are not that different from previous techniques since the first thing in learning is the students' desire to learn. Then, we can talk about the teaching method."

P12) "Unfortunately, some teachers only focus on the transfer of information and do not encourage students to learn, do not use more effective techniques, and do not involve students in the learning process."

P14) "Some of the older and more experienced teachers pay special attention to students' participation in the learning process and always use techniques to encourage them to learn, especially by including group work in the classroom. I really enjoy this type of teaching and learn better in these classes compared to classes that have serious teachers."

P8) "Some teachers look down on students and think that students will become rude in response to professors' friendly behaviors, which is why most teachers are standoffish."

P3) "There are many students in classrooms, which makes creative teaching extremely difficult. This type of training needs certain facilities and equipment. Notably, our classes are relatively small, which makes group work difficult. Nevertheless, our teachers do their best to encourage us to learn better and dedicate time to students outside the classroom hours."

P9) "The faculty members can be creative in using virtual methods to attract students to their class. This is already seen in the classes of some faculty members, but it seems that some other faculty members need empowerment in this area."

5. Discussion

The current study aimed to assess creative teaching in basic medical science classrooms and propose solutions to improve it from the perspective of students using qualitative and quantitative methods.

According to the current study, the creative teaching status in basic medical sciences was moderate. A higher score of creative teaching status was observed in higher years, and the difference between the years was significant.

Table 2. The Mean and Standard Deviation of Creative Teaching Components

Variables	The First Year	The Second Year	The Third Year	The Fourth Year
Challenge	20.32 ± 0.96	28.56 ± 0.21	27.92 ± 0.74	30.56 ± 0.59
Freedom	17.46 ± 0.38	18.84 ± 0.55	21.42 ± 0.89	20.94 ± 0.68
Supporting the ideas	17.28 ± 0.73	20.7 ± 0.90	21.9 ± 0.58	21.90 ± 0.74
Trust and confidence	28.60 ± 0.29	35.20 ± 0.72	40.59 ± 0.61	40.81 ± 0.78
Discussion	17.58 ± 0.82	19.74 ± 0.66	22.26 ± 0.68	23.04 ± 0.65
Happiness	5.6 ± 0.69	7.28 ± 0.53	7.20 ± 0.58	7.52 ± 0.81
Vitality and dynamism	7.83 ± 0.67	9.06 ± 0.57	11.13 ± 0.56	11.40 ± 0.70
Spending time on the ideas	11.84 ± 0.87	12.6 ± 0.82	13.60 ± 0.60	14.48 ± 0.85
Risk-taking	11.08 ± 0.75	11.96 ± 0.71	12.88 ± 0.62	15.64 ± 0.62
Conflict	12.65 ± 0.84	17.50 ± 0.62	16.55 ± 0.61	18.30 ± 0.76
Total	151.24 ± 0.71	180.95 ± 0.59	194.15 ± 0.64	204.6 ± 0.58

Table 3. Analysis of Variance Results for the Status of Creative Teaching in Terms of the Students' Grades

Year	Mean ± Standard Deviation	Creative Teaching Situation	P-Value
First	151.24 ± 0.71	Medium	0.001
Second	180.95 ± 0.59	Medium	
Third	194.15 ± 0.64	High	
Fourth	204.6 ± 0.58	High	

Table 4. Demographic Characteristics of the Participants

Participant No.	Sex	Grade
P1	Female	Third-year
P2	Male	Third-year
P3	Female	Fourth-year
P4	Male	Second-year
P5	Male	Fourth-year
P6	Female	Second-year
P7	Female	Third-year
P8	Male	Fourth-year
P9	Female	Fourth-year
P10	Female	First-year
P11	Male	Third-year
P12	Male	Fourth-year
P13	Female	Second-year
P14	Female	First-year
P15	Female	Third-year
P16	Male	Third-year

Table 5. The Solutions for Promoting Creative Teaching in Basic Medical Sciences

Category	Subcategory	Open Code
Developing software factors	Developing skills and individual abilities of faculty members	Scientific background and experience, interest and motivation, the professors' preparedness, awareness of new teaching methods, consciousness, accessibility, the professors' preferred education method, prioritization of creativity, the faculty members' experience, the faculty members' attitudes and tendency
	Developing skills and individual abilities of students	Interest and motivation, being hard-working, teamwork, the students' demand
	Emotional and cultural support	Paying attention to the cultural differences between the students and professors, paying attention to the power distance between the students and professors, mental security, Learning opportunity, freedom in creative actions, a reliable communication atmosphere, promotion of risk-taking attitudes
Upgrading and developing hardware factors	Supplying physical equipment	Availability of facilities, the layout of the classroom, upgrading virtual classroom systems, providing interactive sections in virtual systems
	Structural and educational reform	Modifying the structure of education, reforming the atmosphere of the school, appropriate classification of the number of students in each class

In addition, the highest mean of creative teaching components belonged to fourth-year students.

Higher education, as a manifestation of the culture of any society, plays a great role in the dynamism and creativity of learners (24). The literature review revealed that creativity is a variable concept and can have different meanings in various areas and conditions (25). According to the literature reviewed in this study, creativity can be affected by various factors such as teacher's characteristics, student's characteristics, and environmental factors.

For example, Mohebiamin et al. reported that creative teaching in the Mashhad School of Nursing and Midwifery was favorable. Nevertheless, students mentioned an unfavorable level of risk-taking opportunities in the teaching process (22). Liu et al. also reported that the mean total scores for creative teaching behaviors were high for the studied nursing faculty (26).

Anarinejad et al. study indicated that the use of creative teaching methods was significantly acceptable among faculty members at Farhangian University (Iran). But, They stated that it needs to be improved. It means that the ability of faculty members was significantly acceptable for reinforcing new and creative ideas in students. According to their study, there is a significant difference between the creative characteristics of faculty members from the perspective of male and female students (21).

Cayirdag's study showed that teachers' self-efficacy and the internal aspects of teacher efficacy predicted the teachers' creativity-fostering behaviors and more experienced teachers were more teacher-centered (15). According to the study by Gunawan and Shieh, there is a significant correlation between creative teaching and the sharing of knowledge, creative teaching, and teacher efficiency (27). According to Choe et al., the concept of creative teacher competencies includes teacher creativity, creative teaching behaviors, and teaching expertise (28).

According to the current findings, it can be interpreted that teachers pay different levels of attention to creative teaching as students move to higher academic years, and there are changes in their knowledge, skills, attitudes, and psychological and support features while taking class environment and learners' needs into account. According to studies, the creative personality trait of curiosity significantly affected the understanding of high-level creative teaching behaviors (22). Mullet et al. emphasized that teachers and researchers have different perceptions of creativity and creative behaviors in students, and it may be related to the teacher's level of experience. Furthermore, many teachers believed that all students had some degree of potential for creativity and that creativity could be promoted in everyone (29).

This study found 28 open codes, 5 subcategories, and 2 categories (developing software factors, upgrading and developing hardware factors) to promote the status of creative teaching in basic medical sciences classrooms. Three subcategories (developing skills and individual abilities of faculty members, developing skills and individual abilities of students, and emotional and cultural support) were placed in the developing software factors category. Two subcategories (supplying physical equipment and structural and educational reform) were placed in the upgrading and developing hardware factors category. Examining these categories, subcategories, and codes showed that these factors reflect the strengths, weaknesses, and, sometimes, the challenges and opportunities facing the creative teaching behaviors of the faculty members.

A review of studies conducted on this subject revealed that several components and subcomponents of the developing software factors category have been assessed and confirmed. For instance, Nikneshan et al. demonstrated that creative teaching is affected by teachers' creative properties in 4 components: The

compatibility of teachers' knowledge with current knowledge, having critical thinking ability, being creative, and being familiar with unique characteristics of students (30).

Erfani et al. found a direct relationship between creative teaching and philosophical mentality, which means that creative teaching could be anticipated based on the faculty's philosophical mentality (5). According to Manurang, the teaching strategies of creative teachers were an important factor in creating motivation in students. This type of teaching requires the active participation of students (31). On the other hand, active participation needs a creative teacher and effective teaching strategies. In fact, learning activities and assignments must be developed in a way that students can experience the practical use of the knowledge learned in the classroom.

Aschenbrenner et al. attempted to determine and predict the creative teaching behaviors of teachers at the University of Missouri from the perspective of students and teachers. Their study showed that teachers have shown creative behaviors in teaching from the point of view of students. These findings were remarkably similar to teachers' perceptions of their creative teaching behaviors. In addition, there was a significant relationship between the creative teaching behaviors of experienced and inexperienced teachers based on student assessments (32).

Gözen showed that attitudes expected from teachers allowed students to think flexibly, freely, and originally. Moreover, teachers do not impose restrictions and rules and use training approaches that integrate a wide range of content in the learning environment (33).

Some studies have assessed the effect of teachers' sex and motivation on their creativity. For instance, Khodabakhshzadeh et al. indicated the impact of creativity on the effectiveness of a teacher's teaching and reported a significant difference between sex and creativity. Furthermore, teachers' motivation had the highest correlation with teaching effectiveness (23). Liu indicated that an educational program of creativity development could increase teaching behaviors and the perceptions of self-efficacy in faculty members (34).

In addition, some studies have pointed out the impact of some subcategories and codes in the hardware factors domain. For example, Cayirdag stated that teachers are forced to take the initiative to teach more creatively in times of system limitation (15). Lawrence noted that the symbolic features of the learning environment are a source of inspiration for creativity (35). Soh highlighted the importance of classroom ecology as a practical approach to fostering students' creativity. Therefore, it is reasoned

that teachers' own teaching behaviors play a critical role in promoting student creativity (36).

5.1. Limitations

The limitation of the current study was that it was conducted on basic medical sciences students in one university and one country.

5.2. Conclusions

A properly developed class will provide a good environment for fostering creativity in students besides creating creativity opportunities in teaching for the teacher. Therefore, the use of appropriate instructional and motivational design models, which are compatible with the educational environment, seems to be a suitable strategy. It is recommended that further research survey creative teaching (challenges and strategies) from the perspective of faculty members.

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Footnotes

Authors' Contribution: Study design: Z. S., M. K., A. Z., A. N. Acquisition of data: G. R., A. N., G. P., L. N., S. S. Data analysis and interpretation: A. Z., M. K., G. R., A. N., Z. S. Study supervision: Z. S. Drafting of the manuscript: A. Z., G. R., A. N. Critical revision of the manuscript for important intellectual content: G. P., L. N., S. S., M. K.

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