Original Article

Pedagogical practices that enhance medical students' capacity for creative thought: A qualitative study

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Abstract

Background & Objective: In the medical field, there is a growing emphasis on fostering creativity and innovation in medical students to prepare them for the unpredictable nature of patient care. This study aimed to explore the perspectives of both lecturers and medical students on the current teaching practices and their influence on the development of creative thinking skills.

Materials & Methods: The study was conducted as qualitative research at the Malaysian Faculty of Medicine and Health Sciences and included a purposeful sample of eight medical students and seven lecturers. Data were gathered through individual semi-structured interviews held via the Google Meet platform and analyzed using a thematic analysis approach.

Results: The findings indicate that learner-centred approaches, such as problem-solving exercises and group discussions, seminars, debates, and dramas have a positive impact on enhancing their creative thinking abilities. The use of technology-assisted teaching methods, including e-learning and simulation labs, was also perceived as inspiring, however, limitations in technical infrastructure were noted. Challenging activities like assignments, games, competitions, and online tests encourage creative learning. Hands-on activities, such as bedside teaching and clinical skill learning, are also valuable in learning clinical skills in unique ways, but their effectiveness could be reduced by environmental and personal factors. Furthermore, practicing para-curriculum activities in a supportive and relaxed learning environment was identified as fostering a culture of original thought.

Conclusion: This study suggests that a comprehensive approach to medical education that integrates creative pedagogy can be instrumental in fostering creativity in medical students. Providing opportunities for creative thinking through workshops and addressing technical infrastructure limitations in technology-assisted teaching methods could be considered in enhancing the creative curricula in the South East region. The findings underline the importance of a learner-centred approach and a supportive learning atmosphere in promoting creative learning.

Keywords: medical education, creative pedagogy, qualitative study, student learning, teaching methodology

Introduction

Creativity is the ability to develop innovative, creative, surprising, and valuable items (1, 2). It is a common occurrence that is more likely to occur during collaboration among interacting groups from a sociocultural perspective (3, 4). Therefore, creativity is closely connected to the domains of social, political, economic, educational, and healthcare (5). Healthcare, in particular, requires creative services to address issues such as a shortage of medical professionals, an increase in administrative work, and the high expense of medical care. Creative remedies are imperative for diseases like AIDS, Ebola, and COVID-19 to be conquered.

As a result, the role of the doctor has shifted from that of a rule-follower to one of a creative doctor who takes on these remarkable challenges (6). In order to prepare medical students to be innovative and skilled doctors, medical educators have had to adopt creative educational strategies (7). Despite novel techniques being tried in

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America, Europe, Australia, and East Asia, there is a lack of research about the implementation of creative medical education in South East Asian nations (7,8).

The purpose of this study is to determine the extent which the teaching-learning practices at the faculty of medicine and health sciences (FMHS) in East Malaysia encourage creative thinking in undergraduate medical students.

Literature Review

The theories that explain creativity in general have a close relationship to creative pedagogy. One of these views is the 4 P's model of creativity, which was created by Rhodes in the 1960s (2, 9). The four components of the 4 P's model are shown in Fig. 1, which are the creative persons, the creative process, the creative product, and the press "environment" that fosters creativity (2, 9). The social, creative, professional, computational, industrial, educational, and health components of modern life are all touched upon by this model of creativity. We might say that in education, the people are the teachers and students alike, the process is interaction between the two the results are meeting curricular goals and producing learners who are capable and creative. Eventually, the press is the educational environment of the institution.

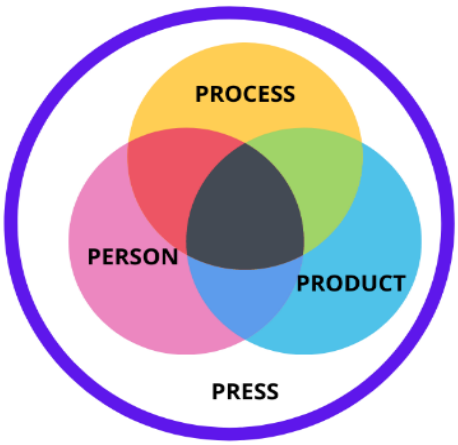

Figure 1. Four P's model of creativity by Rhodes

Teresa Amabile (1983, 1996) developed the componential theory of creativity 20 years later. 11 Amabile's theory focuses on encouraging experience and knowledge in a fun, creative learning environment (Fig. 2) . Amabile (1983) described creativity as the ability to come up with original ideas and solve problems that cannot be solved (10, 11). In the context of education, this includes inspiring and empowering lecturers and students, which are essential elements for fostering the creative thinking process.

Sternberg, however, believed that the creative process (Fig. 3) was the result of the interaction of three different forms of intelligence: creative, analytical, and practical intelligence (11). The learner initially uses creative intelligence to produce original ideas or to solve a problem, followed by analytical intelligence to study, contrast, and evaluate these fresh concepts, and finally practical intelligence to translate an abstract concept into real-world successes (1, 12).

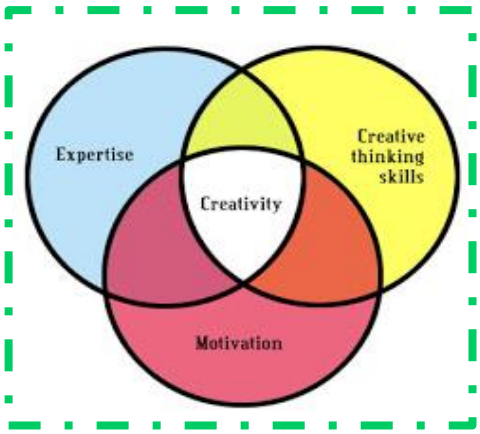

Figure 2. Amabile (1983,1996), Four components of the componential creativity theory

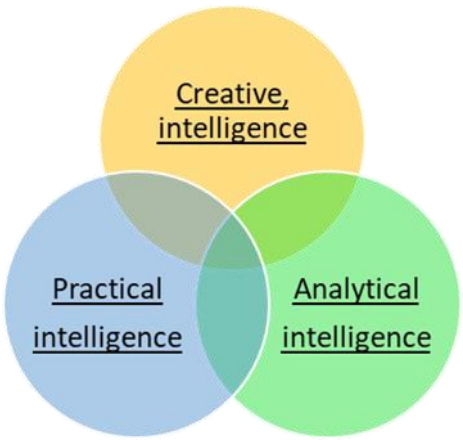

Figure 3. Sternberg's Theory (1996) explained the three aspects of intelligence that control a creative process

Taking into account the aforementioned theories of creativity, Yu Sien Lin (2011) presented the creative pedagogy framework that is said to promote creative education in schooling. As shown in Fig. 4, the interaction between creative teaching (CT), teaching for creativity (TFC), and creative learning (CL) provides the foundation for it (11, 13, 14). By using creative pedagogy, difficult and boring sciences like biology and chemistry in medicine are made more engaging and relevant (15, 16). According to the constructivist

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approach, creative pedagogy principles give students the power to produce new knowledge and interpret their existing information (13, 17) Making unique, notable contributions to one's own learning as well as the lives of others is the aim of CL. This concept satisfies the requirements for creativity by offering something original, unusual, or unique and by being practical, i.e., solving a problem (18). CT is viewed as the engaging, dynamic, efficient, and inventive instruction that captures learners' imaginations (13, 19).

Currently, teaching-learning strategies that enhance creative thinking skills (CTS) in medical education place a strong emphasis on methods that improve active learning (AL) abilities and foster CTS. These methods include enhancing inquiry-based learning, problem-based learning (PBL), divergent thinking (DT), and inductive reasoning to identify potential solutions to problems (27).

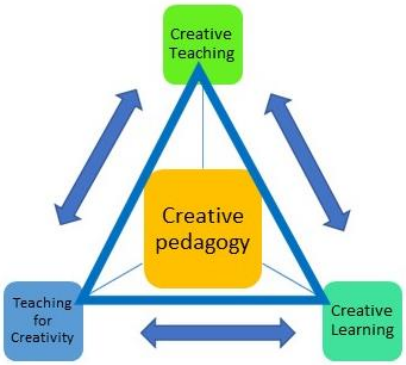

Figure 4. The interrelated elements of the Creative Pedagogy Framework

In conclusion, these theories and strategies provide a foundation for creative pedagogy and promote the development of creative thinking skills in learners. It is important for educators to understand and apply these principles to enhance their teaching methods and create an environment that fosters creativity in students.

Materials & Methods

Design and setting(s)

The study was conducted in Jan 2020, using a qualitative content-analysis project approach to investigate the perspectives of lecturers and students on creative pedagogy used in the Faculty of Medicine at UMS. The researchers used a constructivist-interpretive paradigm to understand how individuals create their social experiences. The study's foundational assumption was relativism, and from an epistemological standpoint, constructivism holds that knowledge is created through subjective processes.

Participants and sampling

The study involved 400 students and 120 lecturers associated with the Faculty of Medicine at UMS. Eight second-to fifth-year students and seven lecturers made up the sample used for the study. The basis for determining the number of participants in the study was primarily driven by practical considerations such as time, resources, and the need to obtain rich and diverse perspectives from both students and lecturers within the given constraints. Maximum variation purposeful sampling was employed to select the interviews to ensure that the sample included a varied mix of different ethnic backgrounds, genders, interests, and learning styles. The Table ١ below shows the quotation from each student or faculty of the university.

Table 1. Quotations From Medical Lecturers and Students

Quotations	Affiliation	Nationality	Age	Gender
L1	Community Medicine Lecturer	Malaysian	50	Male
L2	Psychology Lecturer	Malaysian	40	Female
L3	Pathology, e-learning supervisor	Myanmar	35	Male
L4	Psychology Lecturer	Malaysian	38	Female
L5	Internal Medicine Lecturer	Malaysian	53	Female
L6	Pathology Lecturer	Myanmar	60	Male
L7	Surgery Lecturer	Malaysian	45	Female
L8	Physiology Lecturer	Indian	42	Female
S1	Year 5 Medical Student	Malaysian	25	Male
S2	Year 3 Medical Student	Malaysian	23	Female
S3	Year 4 Medical Student	Malaysian	24	Female
S 4	Year 4 Medical Student	Malaysian	24	Male
S5	Year 2 Medical Student	Malaysian	22	Male
S6	Year 3 Medical Student	Malaysian	23	Female
S 7	Year 5 Medical Student	Malaysian	25	Female

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Tools/Instruments

The authors used semi-structured interviews (SSI) with open-ended questions to conduct the research. A reliable questionnaire created by Gaspar & Mabic (2015) was used as the foundation for the SSI design. Four main questions were used from this questionare which included the following:

1. What educational circumstances that encourage you at FMHS to think creatively?
2. What is the Influence of the existing curriculum's organization and content on your creative thinking?
3. What is the impact of the faculty setting, leadership, and accessible facilities on innovative pedagogy?
4. Which personal factors of lecturers and students do you think impact the process of creative pedagogy.

Data collection methods

5. Permission to interview faculty members and students was requested from the faculty of medicine (FMHS) of UMS, and participants were contacted personally to explain the study's goal and emphasize the anonymity and confidentiality of their personal data. Consent forms were signed by the participants and sent through email. The interviews took place on the "google-meet" platform for 30-45 minutes each, and were then verbally approved by the interviewees before being recorded on Google Drive and an MP3 Sony recorder. The faculty account was used to conduct the Google-Meet, which was password-protected, and both the downloaded interviews and recorded MP3 were stored in a folder that was also password-protected. All conversations were held in simplified English to make them easier to comprehend and guarantee that participants shared authentic experiences. The recorded interviews were transcribed using the Nvivo software, and to correct the ambiguous transcript, another soft copy was saved as computer software. The verbatim was maintained throughout the transcription process to maintain the research's credibility and to show that the data existed in the event of an audit or data validation. For convenience of data processing, each page of an interview that was transcribed was given a label based on a code system If you have utilized artificial intelligence in composing the article, please make a reference to it within the article based on contemporary patterns. he coding process involved assigning codes to segments of data, categories group related codes together, and main themes representing the overarching concepts or patterns that emerged from the data analysis.

Data analysis

Demographic characteristics, such as age, gender, ethnicity, and educational background, were reported descriptively. These characteristics helped provide context and a deeper understanding of the participants involved in the research. The qualitative data was analysed by the researchers using theme analysis (TA). theme analysis, also known as thematic analysis (TA), is a widely used qualitative research method for identifying, analyzing, and reporting patterns or themes within qualitative data. TA involves a systematic and iterative process that helps researchers make sense of the data and uncover underlying meanings and concepts.

The process of conducting theme analysis typically involved the following steps:

1. Familiarization: Researchers become familiar with the data by reading and re-reading the collected materials, such as interview transcripts or field notes. This step helps in gaining a holistic understanding of the data.

2. Coding: Researchers identify and label meaningful units of data, known as codes. These codes represent patterns, concepts, or themes found within the data.

The researchers followed Bryman's four elements of trustworthiness, to ensure the trustworthiness of their data in this qualitative study. Firstly, respondent validation was used to ensure the credibility of the analysis. Secondly, the researchers took measures to address the dependability of the data. Thirdly, purposful sampling was employed to obtain sufficient information power to examine the interviewee's perceptions in order to enhance the transferability of the research. Lastly, the researchers made an effort to prevent bias in interpretation by sticking to the research's verbatim findings rather than summarizing or extracting specific ideas. This ensured the research's Confirmability, which is akin to objectivity. Overall, the researchers took steps to ensure the trustworthiness of their data by addressing the credibility, dependability, transferability, and confirmability of their study (OpenAI, personal communication, 2023).

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Results

Demographic Data

Eight students participated in this study between November to December 2020 during the Covid era. Table 2 represents the demographic data of the respondents.

Table 2. Demographic data of the respondents

	Students	Lecturers
Gender Male: female	3:5	3:4
Age range	21-25	35-60
Race: Malay	3	2
Race: Chinese	2	1
Race: Indian	2	1
Race: Sabahan (Local)	1	1
Race: Myanmarese	00	2
Race: Malaysians: Non-Malaysians	8:0	5:2
Preclinical phase (2nd year)	3	3
Clinical phase (3rd,4th,5th year)	5	1
Teaching Both phases	N/A	3

The data analysis revealed four themes related to the research questions and literature review which was conducted in 2021 debate. The four themes are as follows:

1. Educational circumstances that encourage learners at FMHS to think creatively.
2. Influence of the existing curriculum's organisation and content on pupils' creative thinking.
3. The impact of the faculty setting, leadership, and accessible facilities on innovative pedagogy.
4. Personal factors of lecturers and students that impact the process of creative pedagogy.

Figure 5 shows the subsections on learning scenarios that support creative education. Both lecturers and students agree that FMHS's undergraduate medical students learn best when engaged in activities that are focused on them as individuals. The following are the four sub-themes related to teaching-learning methods that enhance creative education:

1. Attractiveness: Both groups of respondents agreed that seminars and drama performances are learning opportunities that significantly improve creative education (L1, S8). Engaging students' creativity through the presentation of lectures through the use of videos, diagrams, drawings, or models was also recommended by some lecturers (L1, L5).

"In the open educational resources (OER) … how to make the teaching interesting it's important to be interactive and engaging to the students… it is not just (presenting) an ordinary teaching video (L2)".

Some students felt that long, boring lectures, wordy PowerPoint presentations, and no student interaction did summaries, or cartoons publicly in the classroom (S1, S2, S3).

Interestingly, the students pointed out that teaching for creativity is embedded in teaching creatively, the charismatic lecturers enhance creative thinking (S8) , while monotonous lecturers discourage them (S4):

"The way that the lecturers present the knowledge to us should be creative as well, so that when we learn we learn to be creative (S1)".

Lecturers share the concept , as they expressed that :

"The younger generation (of lecturers) is more creative as I believe they were born when creativity has already been taught (L5)".

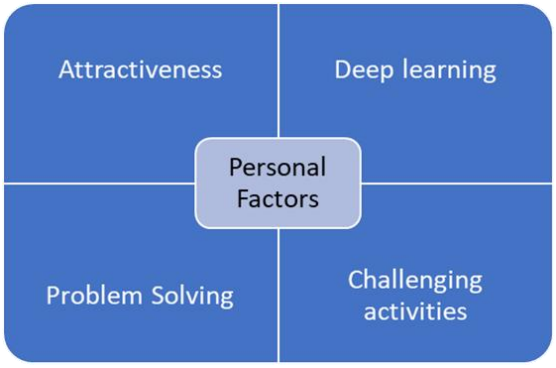

Figure 5. The sub-themes related to the teaching-learning methods that enhance creative education

Discussion

The demographic data from FMHS reveals that the maximum variation deliberate sampling used in the study had a higher percentage of female participants than males, and only local pupils participated based on nationality, with international lecturers contributing. The study included representatives of all four major ethnic groups in Malaysia, although Malays constituted the majority of participants. Additionally, respondents from the clinical phase participated at a higher rate than those from the preclinical phase due to the longer clinical phase.

The study found that learner-centered activities, such as PBL, seminars, debates, and dramas, encouraged active and creative learning, exchange of ideas, and problem-solving abilities, as evidenced by the pattern of outcomes among the participants (23). On the other hand, the classic Socratic approach that emphasizes question-answering skills over the learning process can be negative, particularly in group contexts, due to fear of embarrassment (24).

The participants in the study felt that PBL situations improved their creative thinking skills by encouraging

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brainstorming, inspiration, and enjoyment, which are consistent with the literature's advice to engage in non-judgmental discussions that promote original thought and unconventional problem-solving (25). Despite the PBL sessions' closed-ended problems, which limit their creative thinking process, the participants improved their creative thinking ability to some extent, possibly because the learning was relevant and applicable to real-life situations (25, 26).

Testing activities and competitive assignments, such as quizzes, were also found to promote innovative thinking, and promote retention of information (15). However, some participants suggested that participation in creative activities should be mandatory to encourage more learners to contribute. The idea needs to be studied carefully as it may violate the concept of a stress-free environment of creativity.

The participants found that debate and SGD in democratic environment were appropriate platforms for deep learning, as it promoted critical discussion of why and how instead of what, leading to deep and active learning (24). They also noted that participating in hands-on activities, such as BST and CSL, was a good opportunity to learn clinical skills in unique ways. CSL was seen as a suitable substrate that equipped learners to cope with real patients, while BST during ward rounds enhanced the skills of history-taking during inquiry-based discussions and encouraged creative thinking.

However, some factors reduced the benefits of these practical sessions, such as demonstrating CSL sessions online, which was ineffective during online teaching due to the Covid-19 epidemic. Despite the belief that a simulation lab transfers knowledge into practical situations as mentioned by McDowell, et al (2016), the study found that the simulation lab was not being used effectively due to the lack of competent personnel to operate the technology. To address these issues, many medical institutes use virtual and simulated patients to improve learners' skills when practicing BST.

Consistently with Handfield- Jone's (1993), students' activity such as DaVinci club were perceived as good platforms that enhance learners' creativity because it is conducted in a stress-free environment, and fun.

Limitations of the Study:

1. Small Sample Size: The study used a relatively small sample size of eight medical students and seven lecturers from a single institution. This limits the generalizability of the findings to a larger population of medical students and lecturers.

2. Context-Specific Findings: The study was conducted at the Malaysian Faculty of Medicine and Health Sciences, which may limit the transferability of the findings to other medical education contexts or cultural settings. The specific educational circumstances and infrastructure available at this institution may have influenced the results.

3. Self-Reported Data: The data collected through individual interviews relied on self-reported responses from the participants, which may be subject to social desirability bias or recall bias. Participants may have provided responses that they deemed socially acceptable or may not accurately recall their experiences.

4. Limited Exploration of Other Perspectives: The study focused on the perspectives of lecturers and medical students, but did not explore the viewpoints of other stakeholders, such as patients, healthcare professionals, or administrators. Including a broader range of perspectives could provide a more comprehensive understanding of the factors influencing creative thinking in medical education.

Strengths of the Study:

1. In-Depth Exploration: The study employed qualitative research methods, such as individual semi-structured interviews, to gain in-depth insights into the perspectives of both lecturers and medical students. This allowed for a rich exploration of their experiences and perceptions regarding teaching practices and creative thinking.

2. Varied Mix of Participants: The researchers employed purposeful sampling to ensure a varied mix of participants based on ethnic backgrounds, genders, interests, and learning styles. This approach increased the diversity of perspectives represented in the study, enhancing the richness of the findings.

3. Thematic Analysis Approach: The researchers utilized a thematic analysis approach to analyze the data, which is a rigorous and systematic method for identifying and interpreting patterns and themes within qualitative data. This method helped ensure the organization and meaningful interpretation of the data.

4. Trustworthiness Measures: The study implemented several measures to enhance the trustworthiness of the data, including respondent validation, addressing dependability, employing purposive sampling for information power, and minimizing bias in interpretation. These measures strengthen the credibility and confirmability of the study's findings.

5. Practical Implications: The study's findings provide valuable insights into the pedagogical practices that enhance medical students' capacity for creative thought.

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The identified themes and sub-themes offer practical implications for educators and institutions looking to foster creativity in medical education.

Conclusion

The study suggests that learner-centerer activities, such as PBL, seminars, debates, and dramas, promote active and creative learning and problem-solving abilities. Hands-on activities, such as BST and CSL, are also valuable in learning clinical skills in unique ways, but their effectiveness can be reduced by factors such as ineffective online demonstrations and lack of competent personnel to operate simulation technology. Finally, the idea of mandatory participation in creative activities needs to be studied carefully as it may violate the concept of a stress-free environment of creativity.

Ethical considerations

This research project was conducted with ethical considerations in mind. It was approved by the Medical Research Ethics Committee at University Malaysia Sabah with the approval code JKEtika 4/20 (3), indicating that the research protocol was evaluated and deemed to comply with ethical principles and guidelines for human subjects research.

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Disclosure

The authors declare that they have no conflict of interest.

Author contributions

Dr. Maher Sefein: Conceptualization, Methodology, Investigation, Writing - Original Draft Preparation Dr. Muhammad Talha Zaigham: Data Collection, Analysis, Writing - Review & Editing.

Data availability statement

Upon a reasonable request, the corresponding author can provide the datasets analyzed in this study.

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