Learning through debate during problem-based learning: an active learning strategy

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Submitted 4 October 2016; accepted in final form 25 May 2017

Mumtaz S, Latif R. Learning through debate during problem-based learning: an active learning strategy. Adv Physiol Educ 41: 390–394, 2017; doi:10.1152/advan.00157.2016.—We explored medical student’s views and perceptions of a series of debates conducted during problem-based learning (PBL) practiced as a part of the Spiral curriculum at the Imam Abdulrahman Bin Faisal University, Saudi Arabia. A series of debates were employed during PBL sessions for second-year female medical students, over the period 2014–2016. Each cohort of students was randomly split into 10 small PBL groups and exposed to weekly PBL activity. Within each group, the students were divided into a proposition half and an opposition half. Students were given 1 wk for debate preparation. The students’ responses were recorded on a formulated questionnaire. Descriptive statistics were used to analyze quantitative data, and results are presented as percentages. The usefulness of debate in alleviating potential difficulties in communicating with patients was agreed by 69% (n = 126) of participants. These sessions evoked critical thinking among students was reported by 78% (n = 142). This series of debates helped 61% (n = 111) of students to learn effectively about controversial issues. Seventy-one percent (n = 130) considered that debate promoted argument generation and interpretation skills. Enhanced ability to analyze and research evidence was reported by 59% (n = 108) of students. One hundred and thirteen students (62%) agreed that debate helped them to improve clinical decision-making, and 75% of students agreed that debates encouraged tolerance toward diverse viewpoints/convincing strategies. The majority of our medical students found debating enhanced analytic decision-making, communication, and critical thinking skills.

debate; communication skills; analysis; decision-making; critical thinking

IN THE SCENARIO OF TODAY’S complex health care system, medical graduates should be prepared to be critical thinkers and effective communicators, in addition to having thorough psychomotor skills (19, 29). Many medical schools worldwide have adopted a problem-based learning (PBL) curriculum to inculcate the required qualities in their medical graduates (29, 41). Our university, a relatively new institution in the Kingdom of Saudi Arabia, shifted to a PBL regime in 2014; aiming to assist our students in becoming independent learners prepared for the 21st century, in which medical knowledge will change rapidly. Our present curriculum is a thematic integrated (horizontal and vertical integration) program and places emphasis on acquiring clinical communication and critical thinking skills. The primary integrating modality of our curriculum is PBL, along with a range of different modalities, including tutor-facilitated sessions, tutorials, practicals, simulations, student presentations, and small-group learning, supported by role play, debates, and discussions (6).

Debate/argumentation is the thought process involved in working out confrontational issues with no clear answers (19). Bloom’s taxonomy identifies critical thinking and reasoned argument as higher order thinking skills associated with evaluation skills (24). Debates allow students an opportunity not only to identify that there is an issue to resolve, but also to demonstrate a deeper analysis of the issue, including appraisal, critique, and reasoning of the issue for a potential solution. These skills are also essential because healthcare professionals are frequently swamped with new evidence, and the only way to separate the valid from the invalid is to appraise and critique the evidence (19).

Previous researchers have revealed the merits of debate sessions in a variety of courses, including social sciences (42), tourism (2), allied health professionals (36), pharmacy (20, 21, 25), dentistry (32), and microbiology (5, 35). In the medical profession, debates have been used as effective learning tools in postgraduate residency and training programs (22, 30, 33). However, there is a dearth of studies in the literature documenting the use of debate in the undergraduate medical curriculum. A careful search of the Medline database produced only one study carried out at University of Texas Medical Branch (26). This article described the use of student debates for the development of critical thinking and communication skills in second-year medical students, divided into large groups, i.e., 30 students/group, during an endocrinology and reproduction course. However, none of the studies has explored the merits of debate use with PBL so far. Therefore, the present study was designed to seek medical students’ views, attitudes, and perceptions regarding the use of debate as a learning strategy for enhancing critical thinking, professional analytic, communication skills, and clinical decision-making. To the best of our knowledge, the present study is the first to employ debate as a teaching tool among small groups of medical students during PBL.

METHODS

Ethical approval was sought and granted by our Institutional Review Board, Imam Abdulrahman Bin Faisal University; IRB no. (2015–01–150), for this qualitative study.

Our subjects were two groups of cohorts of second-year undergraduate female medical students enrolled in our University College of Medicine; 2014–2015 entry (110 students) and 2015–2016 entry (132 students). From these two cohorts, 182 (75%) students responded. As
an integral part of the medical curriculum currently being followed in our university, each cohort was randomly split into 10 small PBL groups (10–13 students/group) per semester (two semesters per year) and exposed to weekly PBL activities. Learning strategies used during this weekly activity included case-based, self-directed learning in the form of role plays, debates, and discussions, all aimed at enhancing their communication skills, critical thinking process, analytic and research techniques, clinical decision-making, and group dynamics. Each cohort of students was exposed to six to seven debate sessions/year.

Debate tasks focused on strategies devised by Davis (10), including group dynamics, were aligned with course objectives, structured, adapted to enhance skills and abilities, and established a competitive environment. Tasks were assigned randomly between the two sides of each group by the faculty members. This practice facilitates alternate point of views and critical thinking, as suggested by McKeachie (28). The debate topics included areas of controversy in medicine, such as doctor-patient interaction, antenatal screening, genetic testing, immunization, and alcohol abuse, to complement the PBL delivered during that week. For the debate sessions, students were divided into two halves within each group: a proposition half and an opposition half. Students were provided with clear guidelines for aims and objectives of the debate, including debate structure, format, and task length for each stage (proposition, opposition, rebuttal, closing statements followed by open discussion) and judging criteria. They were provided with sufficient time, i.e., 1 wk for preparation, 20–25 min maximum for the debate session, and 5 min for faculty feedback. The faculty members acted as observers in these sessions and were briefed before each session to critically review the students’ performances, to identify the skills demonstrated and areas of content explored, and to give feedback according to the standardized outlines for which the students were being trained.

On the day of the debate, students usually started by making partitioned seating arrangements. Some group’s role played mimicked courtroom sessions, acting as prosecuting/defending lawyers/judges, with black robes, gavels, etc. Others tried to bring scientific evidence in the form of research publications/web pages/books, etc., to prove their opinion and disprove others.

At the end of each year, the students who provided consent were asked to complete the questionnaire developed by the authors. This questionnaire was based on the studies conducted by Lin and Crawford (27) and Lampkin et al. (25). It had 11 closed-ended statements related to the students’ perceptions of the usefulness of debate sessions for enhancing communication and critical thinking skills, alleviating potential difficulties in learning about controversial issues, promoting argument generation, improving interpretational skills, enhancing the ability to analyze and evaluate evidence, improving clinical decision-making, encouraging tolerance toward diverse view points, and/or convincing strategies. Closed statements were assessed by a 5-point Likert scale. The questionnaire also included a few open-ended questions, aimed at identifying the benefits gained from debate, factors leading to ineffectiveness of debate, ways by which debate will help students as professionals, and open comments/suggestions to improve debate sessions.

Students answered the questionnaire under the direct supervision of one of the two authors. A test-retest technique was adopted to check the reliability and validity of the questionnaire. Ten students were asked to complete the same questionnaire again 2 wk later, to see if they answered in the same manner. The study participants were assured that all responses would be anonymous and would only be used for improving the quality of future sessions and for dissemination in our professional community.

Students’ responses were recorded anonymously with SPSS 20. The versatility of synonymous responses was grouped as 0 = disagree, 1 = neutral, and 2 = agree, for ease of presentation (29). Descriptive statistics were used to analyze the quantitative data. The results obtained were presented in the form of frequencies and percentages.

RESULTS

Due to sex segregation, the student cohort was all women of similar age and demographic background (i.e., Eastern Province of the Kingdom of Saudi Arabia). A total of 182 second-year medical students of 2014–15 and 2015–16, representing 75% of the cohort, completed the questionnaire.

Students experiencing debate sessions during PBL exhibited a dramatic increase in intensity of enthusiasm and depth of knowledge. Key student skills under study were communication, critical thinking, analytic ability, and clinical decision-making. Each student in the PBL group participated in at least one of the following: opening argument, rebuttal, formal debate, and finally closing remarks from each side. Students’ responses have been given in Table 1. When students were asked to share their experience of debate as a learning tool, responses were overwhelmingly positive. Seventy-eight percent (n = 142) agreed that it improved critical thinking skills, 80% (n = 145) agreed that these sessions helped them understand the importance of listening to different viewpoints, and 75% (n = 136) agreed that they were encouraged to listen to different strategies to convince others (Table 1).

The advantage of debate in helping to learn new ways of communication was agreed to by 69% (n = 126) of participants. These series of debates helped 61% (n = 111) of students to learn effectively about controversial issues. One hundred and thirty students (71%) considered that the debates had enhanced their skills to answer questions in front of groups of people, and (62%) agreed that debate helped them to learn...
how body language influences a person’s perception and improve clinical decision-making. Fifty-nine percent \( (n = 108) \) of student reported that debate was a good way to explore and research issues, and 53\% \( (n = 97) \) believed the debates were better than having class discussion on controversial topics. On average, students evaluated themselves as more competent in all assessed areas after participating in these sessions (Table 1).

Only a small proportion of students (4–9\%) were of the opinion that debate sessions were not an effective means to enhance skills of answering questions in front of a group of people, to help understand the importance of listening to different viewpoints, to get used to critical thinking or communication skills, and to listen to different strategies to convince others. Eleven percent were of the opinion that these sessions did not help them learn how body language influences a person’s perception/decision-making, or help them learn about controversial issues. The remaining 18\% of students reported that this learning tool was not better than having class discussion on controversial topics (Table 1).

Responses of students from both second- and third-year Bachelor of Medicine, Bachelor of Surgery were similar concerning how the debates were conducted. That faculty members were not available to guide them was reported by 19\% of the students, and 18\% did not gain any benefits from the library resources database of the university.

In the free text comments (Table 2), students reported that debate helped students in thinking outside of the box to find the differences between issues; provided a platform to widen the range of thoughts by putting them in critical situations where they should think really fast and wisely; and resembled their future career, so it puts them in the situation from early stages and helped them in decision-making for controversial interventions based on evidence. Some even stated that they now know how to differentiate between anecdotal information and evidence. Another free text comment was, “More debate session should be incorporated to achieve maximum effectiveness.”

Negative experiences identified by the students that impeded learning were focused on a lack of group dynamics, loss of temper (emotional outbursts), poor preparation and participation by some people, and digression from the main issue, all of which occasionally hindered the debate process (Table 2). Since preparing for the debate took time, some students complained that it was too time-consuming.

### DISCUSSION

Innovation in teaching has begun in Saudi Arabia. Active learning strategies are now being used in many medical institutes, including our university, showing improvements in quality and variation of education received, especially by women in Saudi Arabia. PBL in undergraduate medical education is in its

<table>
<thead>
<tr>
<th>Asked about Benefits Gained from Debate Sessions</th>
<th>Asked about Ways in Which Debate Can Help Students as Professionals</th>
<th>Asked about Factors Leading to Ineffective Debate Sessions</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Tolerance toward Diverse Ideas</strong></td>
<td><strong>Skills</strong></td>
<td><strong>Group Dynamics</strong></td>
</tr>
<tr>
<td>1. Like the way to share point of view and see positives and negatives in each objective.</td>
<td>1. Effective for expression of speech, feelings, and body language.</td>
<td>1. Unorganized.</td>
</tr>
<tr>
<td>2. Helps in respecting others’ opinion and proving your points; healthy discussion generated.</td>
<td>2. Helps in voicing our opinion and thoughts but with a caution.</td>
<td>2. Loss of temper during the session.</td>
</tr>
<tr>
<td>3. Helps in negotiating without being biased.</td>
<td>3. Improves scientific reasoning based on evidence and facts.</td>
<td>3. Unable to follow the essence or rules of debate session.</td>
</tr>
<tr>
<td>4. Enhances discussion and ability to share diverse ideas and opinions.</td>
<td>4. Could help health professional clarify a patient’s misconceptions regarding a treatment plan/benefits of vaccination.</td>
<td>4. Some students disagree with each other ending in a fight.</td>
</tr>
<tr>
<td>5. Acquire new skills, such as negotiation, giving feedback (positive and negative), and accept others opinion.</td>
<td>5. Improves confident when presenting.</td>
<td>5. Due to lot of students, it is very difficult to give everyone the chance to talk.</td>
</tr>
<tr>
<td><strong>Confidence in Communicating</strong></td>
<td><strong>Time Budgeting</strong></td>
<td><strong>Time Management</strong></td>
</tr>
<tr>
<td>1. Makes students think fast to respond with a better reason or answer.</td>
<td>1. Effective tool to learn time management.</td>
<td>1. Poor time management.</td>
</tr>
<tr>
<td>2. Beneficial to improve communication skills.</td>
<td>2. Learn how to respond and answer fast (set time).</td>
<td></td>
</tr>
<tr>
<td>3. Encourages us to speak.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Improves on-the-spot answers and reasoning.</td>
<td></td>
<td></td>
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<tr>
<td><strong>Sharing of Information</strong></td>
<td><strong>Approach</strong></td>
<td><strong>Preparation and Participation</strong></td>
</tr>
<tr>
<td>1. Provides an intellectually stimulating environment in which students exchange opinions.</td>
<td>1. Learn to deal with different people.</td>
<td>1. Poor preparation leading to lack of participation.</td>
</tr>
<tr>
<td>2. Learning new information in every session and share information by discussing.</td>
<td>2. Try to discover the weakness of other team or pupils.</td>
<td></td>
</tr>
<tr>
<td>3. Encourages contribution.</td>
<td></td>
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<tr>
<td><strong>Retaining Information over Longer Periods</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. More effective to retain information than other learning methods.</td>
<td></td>
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</tbody>
</table>

**Table 2. Overview of student responses to open-ended questions**

In the free text comments (Table 2), students reported that debate helped students in thinking outside of the box to find the differences between issues; provided a platform to widen the range of thoughts by putting them in critical situations where they should think really fast and wisely; and resembled their future career, so it puts them in the situation from early stages and helped them in decision-making for controversial interventions based on evidence. Some even stated that they now know how to differentiate between anecdotal information and evidence. Another free text comment was, “More debate session should be incorporated to achieve maximum effectiveness.”

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### DISCUSSION

Innovation in teaching has begun in Saudi Arabia. Active learning strategies are now being used in many medical institutes, including our university, showing improvements in quality and variation of education received, especially by women in Saudi Arabia. PBL in undergraduate medical education is in its
The present study employed debate as a learning strategy for the first time in PBL sessions at a medical school at Saudi University. Instead of preparing students to become great debaters or actors, our intention was to enhance communication skills, improve critical thinking and problem-solving skills, and to develop confidence, respect, and team work, as shown in our previous work with role play as a learning modality (29) and in other studies (13, 14, 17). The idea was to move away from the traditional classroom setting and lecture format. Hence, the students must go beyond the passive teaching style to the dynamic nature of debating. Students were clearly informed at the beginning that debate would serve as a learning experience and not a test of knowledge gained. The process of preparation for and participation in debate was highlighted rather than the competition. In the end, we investigated students' perception about the debate process during PBL.

Even though the literature supports debate as an effective learning strategy, the negative facets linked to debate are laborious/arduous preparation and a source of frustration on the part of students when aims and objectives are not clear (9, 17). To minimize these pitfalls of debate, our PBL facilitators ensured that students were given clear instructions and had ample time for debate preparation.

Literature reports that debates as a teaching/learning strategy stimulates students' confidence, fosters respect among students, facilitates students' ability to maintain composure, and enhances the students' ability to articulate their own thoughts, based on evidence (9, 23). Since debate is a persuasive argument, the students have to listen actively to their opponents' perspective to make effective rebuttals. Hence, besides improving oral speaking skills, the debate process refines students' listening skills as well (23). The majority of study participants admitted that the debate process helped them to learn new ways of communication, the role of body language in communication, and the importance of listening to different viewpoints and improved their ability/confidence to speak in front of a group of people (Table 1).

Literature states that debate moves students beyond the “rote learning of facts, theories, and techniques” and provides an opportunity of actively integrating and applying knowledge under an array of situations and circumstances (9, 17, 37). While preparing for a debate, a student meticulously researches the issue using reason, logic, and analysis to synthesize opinions. Hence, debate heightens the critical thinking and problem-solving skills, and students master more of the content (39). In the present study, students admitted that debate was a good way to explore and research issues, as debating was dynamic. In a study conducted by Goodwin (18), a majority of the students admitted that the debate process helped them with analyzing and presenting arguments, to recognize and deal with various points of view, and improved their critical thinking.

Students learn more effectively when they play an active role in the learning process, as opposed to passively absorbing information (16). Since debate requires active engagement by students, researchers believe that debates are especially effective teaching tools while dealing with controversial issues (17), as it can better address the multidimensional viewpoints. Our students also admitted that they learnt more about controversial issues through debate. Some issues have multifaceted viewpoints that may be better inscribed in an open discussion (17). Albeit a majority of students agreed that debate was better than having class discussion on controversial issues, debate was followed by class discussion in our scenario. The purpose of open discussion after debate was to allow students to explore how their personnel circumstances and religious and cultural influences may impinge on the topics discussed, as was suggested by DeYoung (11) and Combs and Borne (8).

Debates have been described as an educational forum that fosters clinical reasoning and thinking skills, as well as boosting awareness of attitudes, values, and beliefs while learning specific content (38). Renewed interest in debate as an educational strategy occurred in the early 1980s with the paramount idea of promoting critical thinking, logic, and communication skills (9, 15, 17, 31, 39). In preparation for a debate, students must thoroughly examine and research the problem using reason, logic, and analysis to formulate opinions. This activity of considering the evidence, in different ways, under different conditions, encourages independent thinking in presenting controversial issues. A majority of students in this study enjoyed that debating gave them the opportunity to practice their critical thinking skills, providing rationales for decision-making and the ability to acknowledge argument on both sides of the issue that otherwise might not have been considered.

Based on the results of our study, we propose an important educational modality built on “conceptual learning.” Decision-making (i.e., logic) lies at the core, whereas critical thinking and communication skills are the central outcomes of this learning mode, what the World Health Organization calls universally essential skills of the “five star doctor” (40). Hence we propose that debate, as a learning tool, will help medical students to develop these critical skills effectively.

Limitations of this study. The information was gathered postdebate, and it only described student perceptions. We did not assess or quantify the degree of critical thinking/problem solving/communication skills acquired by the students. Therefore, we cannot comment on whether debate is a more effective teaching strategy or not. Further study incorporating a test and pre- and postdebate sessions or using a control group, would be necessary to allow further conclusions to be made on the effectiveness of the debate strategy. Furthermore, we cannot rule out the possibility that some responses might be based on the desire of the student to please the instructor.

Conclusions. Evaluations from the students demonstrated that the series of debates used during PBL was useful as an active learning tool to enhance crucial skills, such as critical thinking, analytic and communication skills, and clinical decision-making.

ACKNOWLEDGMENTS

We thank the students and faculty members of College of Medicine, Imam Abdulrahman Bin Faisal University, who were involved in this activity. We are also grateful to Asma Al Dossary (fourth-year undergraduate medical student) for helping us in data collection. We further extend our special acknowledgments to Dr. Clodagh Prendergast and Professor Susan Wray from the University of Liverpool, UK for proofreading this article.

DISCLOSURES

No conflicts of interest, financial or otherwise, are declared by the author(s).
AUTHOR CONTRIBUTIONS
S.M. and R.L. conceived and designed research; S.M. and R.L. performed experiments; S.M. and R.L. analyzed data; S.M. and R.L. interpreted results of experiments; S.M. prepared figures; S.M. and R.L. drafted manuscript; S.M. and R.L. edited and revised manuscript; S.M. and R.L. approved final version of manuscript.

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