Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

Elsevier hereby grants permission to make all its COVID-19-related research that is available on the COVID-19 resource centre - including this research content - immediately available in PubMed Central and other publicly funded repositories, such as the WHO COVID database with rights for unrestricted research re-use and analyses in any form or by any means with acknowledgement of the original source. These permissions are granted for free by Elsevier for as long as the COVID-19 resource centre remains active.
Experiences in Teaching and Learning

The use of debates as an active learning tool in a college of pharmacy healthcare delivery course

Samuel K. Peasah*, Leisa L. Marshall

Mercer University College of Pharmacy, 3001 Mercer University Drive, Atlanta, GA 30341, United States

ARTICLE INFO

Keywords:
Debate
Active learning
Healthcare

ABSTRACT

Background and purpose: To describe the use of debates, and to evaluate student performance and perceptions, when student debates are incorporated as an active learning tool in a required pharmacy healthcare delivery course.

Educational activity and setting: Student live debates replaced 15% of a traditional lecture-based course. Twelve healthcare controversies were debated by student teams each year. Student perception of debate utility and opinion on topics, pre- and post-debate, were measured via a voluntary survey. Both peer and instructor's assessments of team performances, as well as individual student performance on the debate-based questions on course exams, contributed to course grade.

Findings: The average survey response rates were 76% (2014) and 86% (2015). Fifteen-54% of student respondents changed their opinion on individual debate topics due to the debates. Although exam performance on debate-based questions was no better than on lecture-based questions, respondents who found the debates useful or very useful in mastering course material increased by 19% post versus pre-debate surveys.

Summary: Debates are an effective active learning tool for engaging students in controversial subjects. Assessment of student performance should include student and instructor evaluations, and can be incorporated into the course grade.

Background and purpose

Activities in the classroom that are designed to promote active involvement of students in the learning process instead of passive listening are defined as active learning activities. Examples of active learning activities include group exercises, problem-based learning, and short writing exercises. Active learning activities are effective tools to engage students and encourage learning in the traditional classroom lecture setting. For example, a recent study by Lucas et al. evaluating the correlation between active learning and core content retention that compared examination scores from course content delivered by active learning methods to that delivered by slide-based lectures found higher scores from sections delivered by active learning. Furthermore, active learning has been shown in different fields to increase critical thinking, improve self-reported student engagement, and deepen understanding of course material. Cavanagh reported that students valued the mix of traditional lecturing with active learning activities over traditional lecturing alone because the active learning activities helped to maintain their interest and attention. It is, therefore, not surprising that the Accreditation Council for Pharmacy Education (ACPE) Standards require incorporation of active learning strategies in the pharmacy curriculum. In addition, the Center for the Advancement of Pharmacy Education (CAPE) Educational http://dx.doi.org/10.1016/j.cptl.2017.01.012

* Corresponding author.
E-mail addresses: Peasah_sk@mercer.edu (S.K. Peasah), Marshall_l@mercer.edu (L.L. Marshall).

http://dx.doi.org/10.1016/j.cptl.2017.01.012

1877-1297/ © 2017 Elsevier Inc. All rights reserved.
Outcomes encourages the development of advanced skills that can be enhanced through active learning activities. Debates, defined as “a formal discussion on a particular matter in a public meeting or legislative assembly, in which opposing arguments are put forward and which usually ends with a vote,” have been used as an active learning strategy in different disciplines, including pharmacy. In pharmacy, debates have been used in core courses including pharmacoepidemiology, and health economics including pharmacoconomics. The course meets once a week for a two-hour class-meeting and in previous years had consisted of only traditional lecture and instructor led discussion format. In 2014, live student debates were introduced as an integral part of the course to enhance active learning. Live student debates replaced about 15% of course previously presented by an instructor via lecture presentations. Course content replaced with debates mostly focused on areas of healthcare delivery controversy or areas with diverse opinions. Some healthcare ethical dilemmas relevant to the course were included because the instructor had exposed the students, in a previous semester course, to materials on ethics and professionalism. This study was designed to describe the incorporation of live student debates and to analyze the effectiveness and students’ perception of the usefulness of these debates in the course in 2014. The study was extended to the 2015 course offering to obtain two years of data and to be able to analyze the effect of several improvements over the inaugural year.

Debate design

USHD is taught in a large classroom setting and enrollment for 2014 and 2015 were 175 and 151 students, respectively. The students were randomly assigned to 26 teams with a maximum of seven students per team in 2014 and 25 teams with a maximum of six students per team in 2015. Students were given 12 possible debate topics. Eleven of the 12 possible topics are listed in Table 1. For the twelfth topic each year, students choose a country in Europe or Canada and debate whether their healthcare system was better than or worse than the U.S. healthcare system. In 2014, there was no team representing the U.S. as in 2015. From the 12 topics, the presenting team made a concluding remark (1–2 min). The second team presented their case in debate format, followed by opposing team and class questions and answers and a concluding remark (14–17 min).

In 2015, a few revisions were made to the debate format. The 2015 debate format was as follows:

- In 2014, teams were asked to research the debate topics and present at least four verifiable points in support of their position. The order of team presentation, pro versus con, was determined randomly.
- Main arguments: The first team presented their case with four verifiable points in debate format with or without an opening statement (10 min).
- Opposing team and class participation: The opposing team, and then the entire class, asked the presenting team questions about their presentation (3–5 min).
- Concluding remark: The presenting team made a concluding remark (1–2 min).
- The second team presented their case in debate format, followed by opposing team and class questions and answers and a concluding remark (14–17 min).
Table 1
Topics for the debates in 2014 and 2015.

| 2014 Debate Topics                                                                 | 2015 Debate Topics                                                                 |
|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|
| 1 Drug prices are highest in the US, should the government set prices like in some developed countries? | Would the Affordable Care Act eventually lead to an efficient healthcare system? |
| 2 A patient was declared brain dead in California after a tonsillectomy; the family wants to keep her alive but a Judge ruled against them based on California law. A pregnant mother is brain dead and the husband wants her feeding tube removed but Texas law forbids termination of the baby. Should technology be allowed to sustain life? | Would the US Healthcare system be better if structured similar to the Education system? |
| 3 Should a patients' right to their medication (for example Plan-B) trump a pharmacists' religious or cultural rights? | Gilead is selling its' hepatitis C drug, Solvadi® for $1000 a pill. Should the FDA be allowed to put a cap on drug prices during drug approval? |
| 4 Would you recommend long term care insurance? | Three states have enacted "Death with Dignity" laws. Would you advocate for such a law in your state? |
| 5 New York Mayor wanted to control the size of soda sold in restaurants as a means to control obesity, should the government regulate health behaviors? | Is medical malpractice litigation necessary? |
| 6 Managed care is a better system than traditional insurance | With the growing threats of epidemics such as Ebola and SARS, should the government use travel restrictions as a public safety tool? |
| 7 Should the US government adopt comparative effectiveness analysis as a cost containment tool? | Chronic diseases are arguably the biggest drivers of healthcare cost. Should the government enact laws to legislate health behavior? |
| 8 The generic market in India is about $11 billion due to the laxity of patency laws. A recent ruling by the Indian Supreme Court denied Novartis® plea to patent an updated version of their cancer drug, Glivec®. Should there be laxness in patency laws in developing countries? | Should professional bodies like the state pharmacy boards become involved in personal behaviors like domestic violence? |
| 9 Corporatization of pharmacy has had negative impact on pharmacy practice | Does Advocacy and lobbying, "the third house", reduce the efficiency of government? |
| 10 Should the US adopt a single-payer healthcare delivery system? | ACCP is advocating residencies as an entry level requirement for practicing pharmacists. Would you support such a requirement? |
| 11 Should healthcare be a right or a commodity in the US? | Given the recent problems with compounding (meningitis outbreak) would it be better for pharmacy practice to focus only on clinical pharmacy and leave compounding to the industry? |

US = United States; ACCP = American College of Clinical Pharmacy; SARS = Severe Acute Respiratory Syndrome; FDA = Federal Drug Administration.

• Opening statement: Each team was required to give an opening statement, with the order determined randomly in turns (about a minute each).

• Main arguments: The team that gave the opening statement first presented their four verifiable points (10 min). The opposing team was then allowed to counter these points, or to ask questions (1–2 min).

• Rebuttal: The first team was allowed to rebut (1–2 min). The second team then presented their main arguments (10 min) and the opposing team was allowed time to counter these points or ask questions (1–2 min), followed by rebuttal (1–2 min).

• Class participation: The class was allowed to ask teams questions after each rebuttal (5 min).

• Closing arguments: The second team gave the closing arguments (1–2 min) followed by the first team (1–2 min).

In 2014 and 2015, students participated in the post-debate survey, which included voting for the team they believed had won the debate and indicating if the debate had changed their mind about the topics presented. In 2015, students also assigned a letter grade to each team based on their assessment of the content and presentation of the debates. The letter grade choices were A+ (95–100), A (90–94), B+ (85–89), B (80–84) or C (below 80).

Debate assessment

In both 2014 and 2015, the incorporation and utility of student debates was evaluated and assessed by team performance on the debates, individual student performance on examination questions based on the debates, and a pre- and post-debate student survey of their individual opinions about the controversial topic in healthcare delivery. In both years, the same instructor graded each debate and assigned a team grade. In 2014 the team grade was worth 10% points of the final course grade and was based on the team slideshow presentation which was required to be submitted a day before the debate. The instructor assessed the slide presentation and returned it to the group with suggestions for revision if it did not address the issue adequately or did not meet the course objectives. Teams could also meet with the instructor while developing their presentation for guidance. The goal was to make sure the topic was adequately covered by the team. A team received full credit if they included and presented at least four points, had verifiable references for each point, and gave a cogent concluding remark. The instructor formulated one multiple-choice question from each team's presentation that was included on either the mid-term or final exams in the course, depending on when the team debated, for a total of 26 questions on course exams. In 2015, a few changes were made to the debate grading, based on student feedback from 2014 end-of-course evaluations. Student feedback included some complaints about the number of debate-based questions added to the course exams, as well as student desire to provide peer assessment of the debate teams beyond stating which team won. In 2015, the team debate grade was increased to 15% of the course grade from the 10% in 2014. Student peer review was added to instructor review for the team debate grade, with 70% of the total team grade from the instructor’s assessment and 30% from
student peer reviews. In 2015, as part of the voluntary post-debate survey, as well as indicating which team won each debate, the objectives of the debates were explained to students and they were asked to assign a letter grade to each team based on a content (70%) and presentation (30%) rubric. The letter grades were weighted (A+ = 1, A = 0.8, B+ = 0.6, B = 0.4, and C = 0.2). These were used to compute the 30% student peer review grade. The instructor also revised the instructor 70% portion of the team grade in 2015. In the rubric, the instructor continued to grade the debates based on content as in 2014, requiring four verifiable points, but this now counted for 70% of the instructor grade and sections on creativity (10%), presentation (10%) and accuracy of claims (10%, with references) were added. The sum of the instructor's portion, 70%, and the student's portion, 30%, were multiplied by 0.15 for the 15% debate portion of the final course grade.

Assessment of student perceptions and demographics

In 2014 and 2015 all enrolled students were asked to take voluntary pre- and post-debate surveys, using Moodle™, the online teaching and learning platform for the College of Pharmacy, immediately before and after each debate. In both 2014 and 2015, students were asked their opinion on each controversial debate topic pre-debate and post-debate and were asked to indicate which team won the debate. As mentioned above, in 2015 one additional survey item collected peer grades for the team debate grades. In both 2014 and 2015, students were invited to take a voluntary pre-course survey at the beginning of the semester for demographic data and to indicate how they perceived themselves ideologically. In 2015 this survey also asked their perception of the possible utility of debates to enhance their knowledge of course content. At the end of the semester in 2015, students were invited to take a post course survey to determine their perception of the utility of the debates in enhancing their knowledge of course content and to provide their thoughts on how content from the debates should be assessed. Students were invited, but not required, to take any of the surveys. Students were required as part of the course syllabus, learning objectives, and grading to participate on a team for the debates.

Analysis

Descriptive statistics were used to summarize the demographic data including age, gender, race, and educational background. The percentage responses from the surveys pre- and post-debate as well as the percentage of students that changed their minds pro or con on each topic were summarized using the feedback tool in Moodle™. Open-ended questions were analyzed qualitatively by summarizing the emerging themes. The percentages of students answering the debate based exams questions correctly were summarized and compared with the percentage answering the traditional lecture exams questions correctly using student t-test in SAS 9.3. Statistical significance level was set at 5%. McNemar paired test was used to compare students’ responses to the usefulness of debates before and after all the debates.

Table 2
Characteristics of enrolled students in 2014 (175a; response rate 97%) and 2015 (151a, response rate 99%).

| Variable                    | Categories          | 2014  | 2015  |
|-----------------------------|---------------------|-------|-------|
|                             | Respondents # (%)   |       |       |
| **Age (years)**             |                     |       |       |
| = < 25                      | 107 (62)            | 100 (67) |
| 26-30                       | 46 (27)             | 36 (24)  |
| 31-40                       | 14 (8)              | 11 (7)   |
| > 40                        | 5 (3)               | 3 (2)    |
| **Race/Ethnicity**          |                     |       |       |
| White (non-Hispanic)        | 96 (55)             | 59 (39)  |
| Black (non-Hispanic)        | 31 (18)             | 34 (22)  |
| Hispanic                    | 4 (2)               | 5 (3)    |
| Asian                       | 37 (21)             | 53 (35)  |
| other                       | 7 (4)               | 1 (1)    |
| **Gender**                  |                     |       |       |
| Male                        | 68 (40)             | 61 (41)  |
| Female                      | 102 (60)            | 89 (59)  |
| **Highest degree before pharmacy school** |   |       |       |
| Doctorate                   | 15 (8)              | 25 (16)  |
| Masters                     | 9 (5)               | 5 (3)    |
| Bachelors                   | 103 (58)            | 90 (58)  |
| Other                       | 50 (28)             | 34 (22)  |
| **Ideological leanings**    |                     |       |       |
| Liberal                     | 34 (20)             | 26 (17)  |
| Conservative                | 59 (34)             | 39 (39)  |
| Moderate                    | 40 (23)             | 48 (31)  |
| Libertarian                 | 11 (6)              | 8 (5)    |
| Don't Know                  | 30 (17)             | 36 (23)  |

* # of students.
Findings

Ninety-seven percent and 99% of enrolled students completed the pre-course surveys in 2014 and 2015, respectively (Table 2). The majority of students were 20–25 years old (62% in 2014 and 66% in 2015). In both years, the majority of the students were female (60%) and majority of students had at least a bachelor's degree before enrolling in pharmacy school (72% in 2014 and 77% in 2015). When asked how they perceived themselves ideologically, 34% in 2014 and 39% in 2015 considered themselves conservatives (Table 2).

In the pre-debate surveys students were asked to provide their opinion on each controversial debate topic question (Tables 3 and 4) as “Yes,” “No,” or “I don’t know” if they were either unfamiliar with the topic or did not have an opinion. In the post-debate surveys, however, students were asked to choose whether they were pro or against the topical issue, after hearing the pro and con arguments, by answering “Yes” or “No” to each topic question and to indicate if they changed their minds because of the debates.

In 2014, when students did not grade their peers’ debate performances, the instructor’s assessment out of 100% was an average of 99.65 (SD 2.82, range 70–100). In 2015, the instructor’s assessment out of 70 was an average of 68.80 (SD 1.41, range 66–70) and the student’s peer assessment out of 30 was an average of 28.26 (SD 0.895, range 24.67–29.35).

In 2015, the pre-course survey, as depicted in Table 2 for 2014 and 2015, included one additional item, not shown on Table 2; this additional survey item for 2015 sought students’ views on the extent to which debates could be useful in learning course content. Twenty-four percent of the 151 respondents said it could be very useful; a total of 71% of students saying at least the debate could be useful. At the end of the course, when asked how useful the debates were in helping them master course material, 38% of respondents said they were very useful (an increase of 14% points); a total of 83% of students saying at least the debates were useful (Fig. 1). A matched or paired McNemar test of 118 students who took both the pre- and post-survey showed a significant difference (Pr. > S

Table 3
Number and percentages of responders to pre-and post-debate surveys per debate topic in 2014.

| Topic                        | Pre-Debate # (%) | RR | 74% | Post-Debate # (%) | RR | 77% | Changed Mind # (%) | RR | 77% |
|------------------------------|------------------|----|-----|-------------------|----|-----|--------------------|----|-----|
| Drug Prices                  |                  |    |     |                    |    |     |                    |    |     |
| # (%)                        | Yes              | No | Don't Know | Yes              | No | Don't Know | Yes              | No | Don't Know |
| 56 (36)                      | 80 (53)          | 16 (11)    | 58 (37)    | 98 (63)          | 38 (24) | 118 (24) |
| Technology and Life          |                  |    |     |                    |    |     |                    |    |     |
| 87 (76)                      | 16 (14)          | 11 (10)    | 114 (84)   | 22 (16)          | 33 (24) | 103 (24) |
| Pharmacist vs. patient rights|                  |    |     |                    |    |     |                    |    |     |
| 91 (68)                      | 42 (32)          | – (–)      | 75 (57)    | 56 (43)          | 27 (21) | 104 (21) |
| Long-term Care               |                  |    |     |                    |    |     |                    |    |     |
| 96 (82)                      | 10 (9)           | 11 (9)    | 130 (78)   | 36 (22)          | 42 (25) | 124 (25) |
| Regulation of health behaviors|                |    |     |                    |    |     |                    |    |     |
| 29 (26)                      | 69 (62)          | 13 (12)    | 60 (36)    | 108 (64)         | 40 (24) | 128 (24) |
| Managed Care                 |                  |    |     |                    |    |     |                    |    |     |
| 58 (43)                      | 21 (15)          | 57 (42)    | 65 (50)    | 64 (50)          | 69 (53) | 55 (53) |
| Comparative Effectiveness    |                  |    |     |                    |    |     |                    |    |     |
| 71 (53)                      | 19 (14)          | 43 (32)    | 60 (43)    | 81 (57)          | 76 (54) | 65 (54) |
| Laxness in Patency           |                  |    |     |                    |    |     |                    |    |     |
| 36 (30)                      | 57 (47)          | 28 (23)    | 55 (41)    | 79 (63)          | 49 (37) | 79 (37) |
| Corporatization              |                  |    |     |                    |    |     |                    |    |     |
| 82 (57)                      | 28 (20)          | 33 (23)    | 89 (63)    | 52 (37)          | 43 (30) | 98 (30) |
| Single Payer                 |                  |    |     |                    |    |     |                    |    |     |
| 36 (26)                      | 59 (42)          | 44 (32)    | 36 (28)    | 91 (72)          | 57 (45) | 70 (45) |
| Healthcare Commodity or Right|                  |    |     |                    |    |     |                    |    |     |
| 59 (42)                      | 66 (47)          | 14 (10)    | 44 (41)    | 64 (59)          | 29 (27) | 79 (27) |
| Canada                       |                  |    |     |                    |    |     |                    |    |     |
| 52 (42)                      | 41 (33)          | 30 (24)    | 54 (45)    | 66 (55)          | 34 (28) | 86 (28) |
| France                       |                  |    |     |                    |    |     |                    |    |     |
| 37 (30)                      | 35 (28)          | 51 (41)    | 41 (34)    | 79 (66)          | 43 (36) | 77 (36) |
| Sweden                       |                  |    |     |                    |    |     |                    |    |     |
| 30 (24)                      | 39 (32)          | 54 (44)    | 43 (36)    | 77 (64)          | 40 (33) | 80 (33) |
| UK                           |                  |    |     |                    |    |     |                    |    |     |
| 35 (28)                      | 42 (34)          | 46 (37)    | 49 (41)    | 71 (59)          | 40 (33) | 80 (33) |

UK = United Kingdom.

* # is number of respondents and RR = response rate.
between the two responses with 83 (70%) students indicating debates were useful or very useful in the pre- and 105 (89%) indicating debates were useful or very useful in the post-debates survey. Finally, a student t-test was used to compare the percentage of students who correctly answered examination questions from course content presented by the traditional lectures to those who correctly answered the questions from the debate based content. In 2014, the average was 0.7388 for the debate vs. 0.7630 for the lecture (p-value 0.7225) on the mid-term exams, and 0.5903 for the debate vs. 0.7250 for the lecture (p-value 0.0149) on the final exams. In 2015, all debate based questions were on the final exams and the average was 0.7180 for the debate vs. 0.7586 for the lecture (p-value 0.4045) in the final exams. The only statistically significant differences between the two were on the final exams of 2014.

Table 4
Number and percentages of responders to pre-and post-debate surveys per debate topic in 2015.

| Topic                      | Pre-Debate # (%) RR* 88% | Post-Debate # (%) RR* 86% | Changed Mind # (%) RR* 86% |
|----------------------------|--------------------------|---------------------------|---------------------------|
|                            | Yes | No | Don’t Know | Yes | No | Yes | No |
| Affordable Care Act        | 52  | 45 | 28        | 68  | 74 | 26  | 115 |
| Medical malpractice        | 97  | 8  | 21        | 112 | 23 | 36  | 100 |
| Travel restrictions        | 92  | 29 | 5         | 98  | 34 | 27  | 105 |
| Death with Dignity         | 63  | 39 | 31        | 78  | 52 | 30  | 99 |
| Education system           | 20  | 70 | 54        | 29  | 109| 45  | 90 |
| Drug price cap             | 86  | 30 | 18        | 67  | 56 | 29  | 91 |
| Health behavior            | 52  | 72 | 17        | 64  | 58 | 43  | 80 |
| Board of Pharmacy          | 45  | 52 | 21        | 41  | 63 | 33  | 70 |
| Residencies                | 21  | 103| 6         | 27  | 104| 19  | 111|
| Advocacy/Lobbying          | 36  | 78 | 20        | 43  | 84 | 39  | 89 |
| Compounding                | 34  | 80 | 16        | 35  | 83 | 29  | 88 |
| France                     | 67  | 26 | 43        | 106 | 27 | 52  | 80 |
| Switzerland                | 60  | 22 | 51        | 88  | 44 | 45  | 84 |
| Germany                    | 61  | 35 | 39        | 81  | 49 | 40  | 91 |

*a RR = response rate.

0.00019) between the two responses with 83 (70%) students indicating debates were useful or very useful in the pre- and 105 (89%) indicating debates were useful or very useful in the post-debates survey. Finally, a student t-test was used to compare the percentage of students who correctly answered examination questions from course content presented by the traditional lectures to those who correctly answered the questions from the debate based content. In 2014, the average was 0.7388 for the debate vs. 0.7630 for the lecture (p-value 0.7225) on the mid-term exams, and 0.5903 for the debate vs. 0.7250 for the lecture (p-value 0.0149) on the final exams. In 2015, all debate based questions were on the final exams and the average was 0.7180 for the debate vs. 0.7586 for the lecture (p-value 0.4045) in the final exams. The only statistically significant differences between the two were on the final exams of 2014.

Fig. 1. 2015 Student survey responses on the usefulness of debates pre and post-course.
Discussion

This study evaluated the usefulness of live student debates when incorporated in a social science-related course. The usefulness of debates in developing skills such as critical thinking, teamwork, and public speaking has been established with studies in different disciplines including pharmacy.\textsuperscript{6–20} This study was unique in that it allowed for two years of data for debate design evaluation and implementation of improvements. It also demonstrated how live team-debates can be assessed and incorporated into individual students’ course grades in a required course in a large group classroom setting.

In the current study, the number of students who changed their minds on controversial debate topics because of the debates was similar to that reported by Lampkin et al.,\textsuperscript{13} in which 31% of students changed their minds after the debates. Debates allow both presenters and observers the chance to actively weigh opposing sides of a topic in an engaging way which forces them to re-think their positions more intensely than is required in a traditional slide-based teaching.\textsuperscript{29} Although this intensity is likely to be greater in the presenting team than in the listening team, the format, which is different from traditional lectures, can increase the students’ level of engagement and interest.

Summative assessments are essential in deducing the extent to which students have learned material from a course. In 2014, 20% and 23% of the mid-term and final exams questions, respectively, were from the debates. In addition to the disproportionate number of debate-based questions in both exams, in the finals, the students took exams in another course in the morning prior to USHD exams in the afternoon. This could explain why there was a statistically significant difference in performance between the lecture-based questions and debate-based questions. In 2015, when the debate based questions were reduced to those from six debate presentations, there was no statistically significant difference in the percentage of students’ scores in both traditional and debate based questions. Debates are already believed to fall under the higher order in Blooms’ Taxonomy of Learning, where the skill acquired is more of the higher level of ‘shows-how’ instead of ‘know or knows how’ (which are of the lower level).\textsuperscript{11,21} A limitation of this study was that it was not designed to robustly test the difference between traditional and debate-based question performance. Additionally, multiple-choice questions were used because of the size of the class instead of a more appropriate higher order learning assessment tool. The items covered in each was not the same, and the number of questions from the debates was small compared to those from the lectures (26 out of 117 in 2014, 9 out of 71 in 2015).

There are other limitations of this study worth mentioning. Policy-heavy courses are often laden with strong ideological stands and it was difficult to tell if students were able to take off those filters in deciding if they changed their minds or not; perhaps not allowing students to choose “I don’t know” post-debate reduced our ability to distinguish among those who truly changed their minds. Additionally, a student indication of a changed mind about a controversial topic is not necessarily an indication of learning, but rather showing they were engaged enough to change their opinion. The objective of the debates was not to change students’ minds on these controversial issues but to present them with information from both sides of the issue to improve their knowledge of the subject and help them formulate their own decisions.

Summary

Incorporating debates in a health care delivery course could be a useful active learning tool for student learning and engagement throughout the semester. Preparing for debates is a useful active learning activity for the presenting groups, and the interest generated by the debates provides the necessary engagement for active learning in the classroom by the rest of the class. Assessment of student performance in debates should include student and instructor evaluations, and this can be incorporated into the course grade. Additional ways of assessing students’ acquired knowledge from team debates that could be explored in future studies could include a one-page reflection on the debate topics or quizzes after each debate.

Conflict of interest/financial disclosure statements

The authors have no financial disclosures and report of no conflict of interest.

Acknowledgements

The authors will like to thank Mr. Reid Proctor for his technical support with the survey data management.

References

1. Paulson DR, Faust JL. Active Learning for the College Classroom. Available at: <http://web.calstatela.edu/dept/chem/chem2/Active/>. (Accessed April 10, 2017).
2. Gleason BL, Peeters MJ, Resman-Targo BH, et al. An active learning strategies primer for achieving ability-based educational outcomes. Am J Pharm Educ. 2011;75(9) Article 186.
3. Reddy IK. Implementation of a pharmaceutics course in a large class through active learning using quick-think and case-based learning. Am J Pharm Educ. 2000;64(4):348–354.
4. Lucas KH, Testman JA, Hoyland MN, Kimble AM, Euler ML. Correlation between active-learning coursework and student retention of core content during advanced pharmacy practice experiences. Am J Pharm Educ. 2013;77(8) Article 171.
5. Graffam B. Active learning in medical education: strategies for beginning implementation. Med Teach. 2007;29(1):38–42.
6. Bonwell CC, Eison JA. Active Learning: Creating Excitement in the Classroom. [ASHEERIC Higher Education Report No.1]. Washington, DC: George Washington University.
7. Prince MJ. Does active learning work? A review of the research. J Eng Educ. 2004;93(3):223–231.
8. Cavanagh M. Students’ experiences of active engagement through cooperative learning activities in lectures. *Act Learn High Educ.* 2011;12(1):23–33.
9. Accreditation Council for Pharmacy Education. *Accreditation Standards and Key Elements for the Professional Program in Pharmacy Leading to the Doctor of Pharmacy Degree (Standards 2016).* Available at: [https://www.acpe-accredit.org/pdf/Standards2016FINAL.pdf]; Published February 2015 (Accessed 9 January, 2017).
10. Medina MS, Piazza CM, Stowe CD, et al. Center for the advancement of pharmacy education 2013 educational outcomes. *Am J Pharm Educ.* 2013;77(8) Article 162.
11. Hanna L, Barry J, Donnelly R, et al. Using debates to teach pharmacy students about ethical issues. *Am J Pharm Educ.* 2014;78(3) Article 57.
12. Smith Randolph D. Student perceptions of the use of debates as a teaching strategy in the allied health professions. *J Allied Health.* 2007;36(1):e13–e29.
13. Rubin RW, Weyant RJ, Trovato CA. Utilizing debates as an instructional tool for dental students. *J Dent Educ.* 2008;72(3):282–287.
14. Moore KG, Clements J, Sease J, Anderson Z. The utility of clinical controversy debates in an ambulatory care elective. *Curr Pharm Teach Learn.* 2015;7(2):239–248.
15. Lampkin SJ, Collins C, Danison R, et al. Active learning through a debate series in a first-year pharmacy self-care course. *Am J Pharm Educ.* 2015;79(2) Article 25.
16. Lin S, Crawford SY. An online debate series for first year pharmacy students. *Am J Pharm Educ.* 2007;71(1) Article 12.
17. Erstad B, Murphy J. Developing critical interaction skills in students: debating clinical pharmacokinetic controversies. *Am J Pharm Educ.* 1994;58(4):440–445.
18. Charrios TL, Appleton M. Online debates to enhance critical thinking in pharmacotherapy. *Am J Pharm Educ.* 2013;77(8) Article 170.
19. Bussieres JF, Delicourt A, Belaid N, et al. Impact of a debate on pharmacy students’ views of online pharmacy practice. *Int J Pharm Pract.* 2012;20(6):409–412.
20. Kennedy R. In-class debates: fertile ground for active learning and the cultivation of critical thinking and oral communication skills. *Int J Teach Learn High Educ.* 2007;19(2):183–190.
21. Bloom BS, Ed. *Taxonomy of educational objectives. The Classification of Educational Goals. Handbook I: Cognitive Domain.* New York, NY: McKay, 1056.