Students' Perceptions of an Active Learning Session in Pharmaceutical Calculations

School of Pharmacy

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DISCLOSURE

The authors of this poster have nothing to disclose.

OBJECTIVES

Develop and implement a pharmaceutical calculation active learning activity and assess students' engagement, teamwork, and confidence performing calculations.

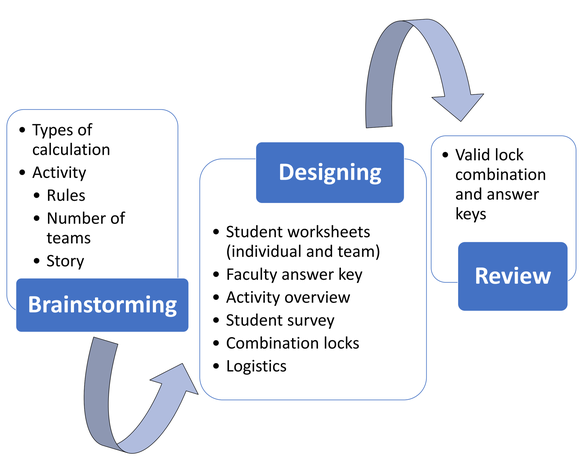
BACKGROUND

- Accreditation Council for Pharmacy Education Standards 2016 emphasize integration of active learning pedagogy in the pharmacy curriculum to engage learners.[1,2]
- Eighty seven percent of all schools and colleges of pharmacy utilize active learning strategies in their pharmacy curriculum.[3]
- Active learning strategies can increase student engagement and motivation for learning and understanding calculations, and they allow students to assume responsibility for self-directed learning.[1]
- West Coast University developed and implemented an active learning activity to optimize teaching and learning of pharmaceutical calculations.

METHODS

Activity Development

Figure 1. Phases and Components of the Activity



METHODS (CONT.)

Activity Implementation

Logistics

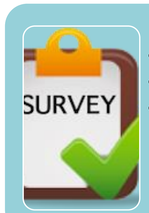
- Activity overview
- 45 minutes for activity

Teams

- Groups of four
- Third year pharmacy students
- Each student completed a unique calculation problem set comprised of seven questions
- Students used group member's answers to generate a lock combination

Calculation Topics

- Percentage Strength
- Ratio Strength
- Dilution
- Flow Rates
- Milliequivalents
- Osmolarity



Survey

- Anonymous and voluntary
- Administered post activity
- 12-item, four-point Likert-scale survey (Strongly Disagree to Strongly Agree)
  - Engagement
  - Teamwork
  - Confidence

RESULTS

- Thirty-four students completed the post-activity survey, yielding a response rate of 77%.
- 82% -88% of students agreed/strongly agreed they are more comfortable performing calculations (see Figure 2).
- 94% of students agreed/strongly agreed their teammates were engaged.
- 91% of students agreed/strongly agreed this activity improved their ability to work in teams.
- 88% of students agreed/strongly agreed they would like to do this activity in other courses.

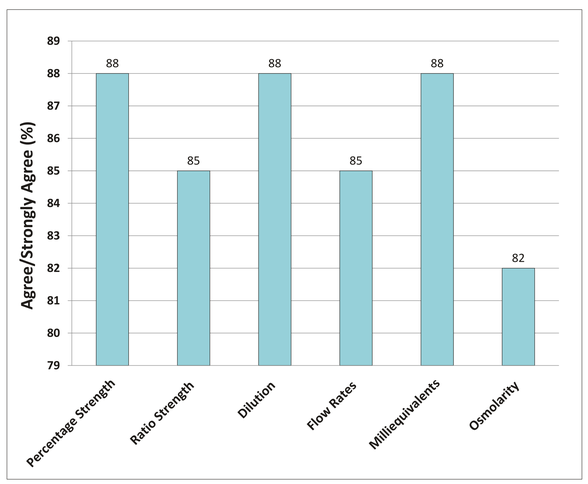
RESULTS (CONT.)

Table 1. Survey Results

Survey Item	Agree/Strongly Agree (%) (N=34)	Median [interquartile range (IQR), 25-75%] (N=34)
I am more comfortable performing calculations related to percentage strength	88	4 (3-4)
I am more comfortable performing calculations related to ratio strength*	85	4 (3-4)
I am more comfortable performing calculations related to dilution (C1V1= C2V2)	88	4 (3-4)
I am more comfortable performing calculations related to flow rates	85	4 (3-4)
I am more comfortable performing calculations related to milliequivalents	88	4 (3-4)
I am more comfortable performing calculations related to osmolarity/mOsmol	82	4 (3-4)
My teammates were engaged in the activity	94	4 (4-4)
This activity improved my ability to work in team setting	91	4 (3-4)
I would like to do this type of activity in other courses	88	4 (3-4)
I enjoyed the activity*	85	4 (3-4)
Number of teammates were appropriate for the activity	88	4 (3.25-4)
I was given adequate time to complete the activity	94	4 (3-4)

*One student did not provide answer for this item.

Figure 2. Students' Perception of Their Confidence in Pharmaceutical Calculations



DISCUSSION

- Students had a positive learning experience during this active learning session.
- This activity promoted individual accountability while providing an opportunity for peer collaboration and teaching of pharmaceutical calculations.
- This activity can be modified to include more complex concepts such as isotonicity, percent ionization, and TPN.
- Identified challenges and opportunities for improvement:
  - Time: provide enough time for faculty to prepare for activity and for students to complete the activity.
  - Debrief: allow students an opportunity to reflect and identify areas of strengths and weaknesses.
  - Student preparation: ensure students are prepared and have a foundational knowledge in calculations before implementing this activity.

CONCLUSION AND IMPLICATIONS

- Teaching and learning is a shared responsibility between students and faculty.[4]
- Implementing creative strategies to teach difficult concepts to large cohorts of students is important and necessary for meaningful learning.[4]
- Problem-based active learning strategies prepare students to be self-directed life-long learners.[1]
- This activity promotes collaboration and teamwork in small groups and enables students to take responsibility for their own learning and the group's learning.
- This activity can be expanded to other classes to reinforce calculations and teamwork.

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