

Assessing the Impact of an Interactive Learning Activity on the Teaching of Aliquots

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Introduction

The Accreditation Council for Pharmacy Education's Standards 2016 require that the didactic portion of the Pharm.D. curriculum be delivered using teaching methods that "facilitate achievement of learning outcomes", "actively engage learners", and "foster collaborative learning" (Standard 10, Key Element 10.12).¹ Focusing on ways to increasing active learning, a faculty member incorporated an interactive learning activity (making of snack mix) centered around aliquots in to a first semester pharmacy practice course.

Objective

Evaluate the impact of an interactive learning activity on the teaching of aliquots.

Methods

- Prior to coming to lecture, students were asked to read a chapter in the required textbook.
- The lecture period started with a short introduction of aliquots, which included an overview of the information in the textbook. Then, supplies were distributed and students worked to compound a snack mix that contained the medication prescribed. The lecture ended with a review of the aliquot process, an evaluation of accuracy, and some practice problems.
- A self-administered questionnaire survey with a 5-point Likert scale was developed to examine student perceptions before and after the interactive learning activity. In addition, the pre-assessment asked students to identify whether or not they completed the assigned reading prior to coming to class.

References

1. American Council on 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>

Results

- Many of the qualitative comments focused on the positive impact the hands-on activity had on their understanding of the aliquot process.

Table 1. Survey Results

Survey Question	Pre-Lecture (Mean)	Post-Lecture (Mean)
How confident are you that you could define what an aliquot is? <small>(1 being "Not at all Confident" and 5 being "Totally Confident")</small>	3.04	4.46 *
How comfortable do you feel about the process of completing the aliquot method? <small>(1 being "Not at all Comfortable" and 5 being "Totally Comfortable")</small>	2.38	4.13 *
Can you see the clinical application of aliquots? <small>(1 being "Not at all" and 5 being "Totally Clear")</small>	3.48	4.68 *
Did you complete the assigned reading prior to coming to class today? <small>(1 being "Not at all", 3 being "I read parts of it", and 5 being "I read it multiple times")</small>	2.99	

* P-Value < 0.05 when comparing the difference between pre- and post-survey

Materials needed:

- 24 ounces of plain M&M's
- 12 ounces of salted peanuts
- 1 cup of raisins
- 11 ounces of butterscotch chips
- 2 large freezer sized storage bags
- 10 sandwich or snack sized storage bags
- A digital scale with a sensitivity requirement of 1 g (it can be lower, but then you will need to change the recipe because your LMQ will be quite low)

Prior to class, combine the M&M's, peanuts, and butterscotch chips into one freezer sized storage bag and use this as the "diluent." The raisins are the "medication."

Practice question for the activity:

A prescription calls for 20 grams of raisins every day for 10 days. Using a prescription balance with a sensitivity requirement of 1 g (1000 mg), explain how you would obtain the required number of raisins with an error not greater than 1%.

In class, have the students complete the following steps:

- Calculate a least measurable quantity (LMQ)
- Pick a multiple – May want to suggest 10 days since that is how long the prescription needs to last
- Calculate how much drug they will need
- Calculate how much diluent they will need
- Measure out the raisins (step 3) and diluent (step 4), and then mix them together in a freezer sized storage bag
- Measure out 10 aliquots (or whatever number you decide on in step 2) from the completed mixture and place each one in a small sandwich sized storage bag



"Doing this hands on activity was helpful in being able to see and apply the process rather than just reading an equation off the board."



"I thought it made it easier to see how this would be applicable in a pharmacy. It was also nice to break each step up and do them separately."

"Good visual and hands on method of learning aliquots, thank you."

Implications

- The interactive learning activity positively impacted the students' understanding of aliquots, the aliquot process, and the clinical application of aliquots.