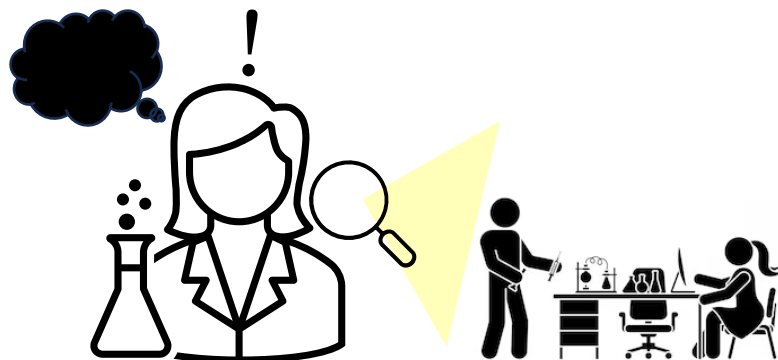


How to design experiment-specific survey items for laboratory teaching assistants?



#2526716: *Developing Expertise in Survey Design to Identify Advancements for Effectiveness and Excellence in Chemistry Instructional Laboratories*

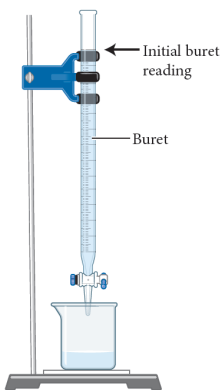
Teaching-Learning is a Reciprocal Process



- Requires “teachers” selecting content in which “students” choose to engage
- Teachers -> opportunities for learning across **cognitive**, **psychomotor**, and **affective** dimensions
- General chemistry lab = get a good grade and leave early

- Chemical Education Research: students’ meaningful learning is extensively studied
- Ongoing gap: teaching assistants’ (TAs) pedagogy that notices meaningful learning opportunities with **chemistry topic specificity for prevalent experiments**

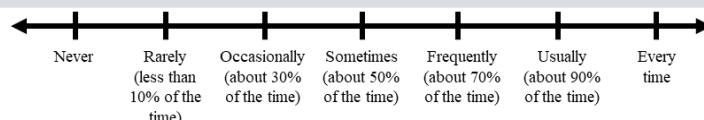
Preliminary Findings & Current Progress



Qualitative video research showed that, during acid-base titrations, TAs...

- (1) Conflate acid vs. hydronium ions,
- (2) manipulate the buret to increase efficiency,
- (3) prioritize students’ happiness potentially at the expense of conceptual understanding, and
- (4) avoid all dimensions simultaneously

7-point Likert survey item development



- (C) “I value when students explain pKa in terms of aqueous species moving, colliding, and/or dissociating”
- (P) “I have students discuss during laboratory the accuracy and precision of a pipette (when compared to other glassware) for delivering a specific volume of analyte.”
- (A) “I endeavor to learn about my students’ experiences with acids/bases in their everyday lives beyond vinegar and soap”

Methods

Survey development

Hierarchical Linear Modeling

- Collect cognitive interviews from chemistry teaching assistants.
- Do expert validation with advisory board members
- Validate instrument using confirmatory factor analysis (cognitive, psychomotor, and affective)
- Determine reliability using McDonald’s Omega

Challenge Areas

Validity and Reliability

- How unidimensional is noticing and teaching for meaningful learning? Arguably, every TA action could be rationalized for making students **happy**.
- How to prime respondent attention during survey? Considerations include including brief scenarios and images

