In-class Writing in a Large Analytical Chemistry Course

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Approximately 150 students were enrolled in CHEM 211. Students enrol in this course are Chemistry majors, Biochemistry majors, Food and Nutritional Science majors as well as other Science students. The course met on Tuesdays and Thursdays for 1.5 hours each.

Teaching Style in CHEM 211: TBL

I used team-based learning (TBL) in CHEM 211 where some class time was turned into TBL "events". During these events, students were required to read from the textbook ahead of time and were given a 15 min multiple choice test on the pre-reading which they completed individually. They then took the same test again as a group. Finally, as a group, they looked at a case study that applied the materials from pre-reading. Each case required argumentation skills where a decision had to be made supportive with reasons. At the end of class, each group made their decision known and argued as a whole class.

WHY In-Class Writing??

From the start of term, I emphasized the importance of argumentation in science. Providing reasons/evidence/rationale for claims was as important, if not more important than the claim itself. Communicating those reasons/evidence/rationale effectively was a skill worth learning. The students would be communicating support for their claims orally during the TBL events but I also wanted them to have practice doing this in the written form. I told students that they would be asked questions on an exam where they would have to make a decision and provide reasons for their answer. Rather than read convoluted long paragraphs, I wanted to read clear concise writing. Thus, during class, we would have "Writing Prompts" where students would be given a question and asked to make a claim.

HOW? What was told to students

During class, students were given 5 minutes to write a written response to a claim. An example writing prompt:

"Of the significance tests discussed, in your opinion, which test serves as the best figure of merit for accuracy?"
The students were instructed to use the following format in their answer:
Write3-5 sentences that include:
CLAIM: A sentence that asserts something.
REASON/EVIDENCE/EXAMPLE: A sentence that supports the claim.
Take 2 minutes and write an outline of your argument.

HOW? Marking and Feedback

I took a lot of time marking and providing written feedback for the first writing prompt. I failed about 40% of the class on the assignment. The students who failed were told that they had to come see me by signing up for a 10-minute appointment. I met with all the students who failed the assignment individually to give them oral feedback.

For the next writing prompt, I marked without much feedback and doubled-checked that the students I met with were doing better. I met with a handful of students after the second writing assignment.

For the last two writing prompts, the TA marked the prompts mainly for participation.

The writing prompts combined with iClicker questions were **worth 3% of the course grade.**

If an analyte can be detected using Spectrophotometry, in your opinion, what is the best way to maximize sensitivity of the measurement?

Support your choice with a rationale.

In your opinion, what is the most important consideration to make when you are deciding on an analytical method for an analyte in a sample with a complex matrix?

Selectivity is a figure of merit. In your opinion, why is selectivity an important criterion for evaluating an analytical method?