**Data**

 Fall 2017: 25 students started the course

 Fall 2017: 15 completed the course with 13 receiving a C or better

 The “norm” for me is to start with 32 students, lose approximately 4 students and have about 25 students pass the class. This has been my experience for many years now.

So, what happened in Fall 2017?

**Changes Made**

**Journal Fall 2017 (this was the largest change made to Fall 17 as compared to previous semesters)**

 In Fall 2017, I incorporated journal writing in my courses for the 1st time. This replaced turning in a workbook where they did lots of practice (drill and kill). I had a written set of expectations for journal writing, similar to Chemistry’s expectations (borrowed from Levi Torrison). The journal was collected a few times the 1st two weeks of the semester and the class as a whole was shown what makes a good journal. Then, the journal was randomly collected throughout the semester. Students were given partial credit based off of what they turned in and how much of my expectations they met. Journal grade was part of homework/quizzes for 10% of the class grade.

**Journal Spring 2018**

 During the week of accountability, approximately 15 faculty got together to discuss best practices in journal writing. From this meeting, I made some major changes to how I do journals.

 The written expectations given to students was updated with some changes to the format of the journal (this will be another CATS). I also adopted Levi Torrison’s grading policy of giving students an all or nothing grade. If students didn’t fully meet the expectations of the journal, they can redo the journal to get their grade raised from a 0 to full points. I collected the journal every day for the 1st three weeks and gave the class feedback by showing them good journals, mediocre journals, and poor journals (student names were not shared, only journal entries were shown by utilizing the document camera). Students were allowed to redo their journal for up to 1 week to improve their journal grades.

 I also have journals as their own percent of the total grade for the course: 10%.

 In the 1st 4 weeks, as compared to last semester, the journals are much better quality. Students are explaining concepts more and providing detailed explanations to worked out math problems. The quality of writing has been much higher.

Changes Made: More feedback, clearer expectations, and opportunity to improve grade after collected

**Workbook Fall 2017**

The workbook used in fall 2017 is written by me and was a supplement to a textbook. This workbook has not been changed for the last 2 years, except for modifications to wording on one of the labs done in class. In Fall 2017, students were not expected to purchase the textbook, and practice problems from the textbook were not emphasized like previous semesters. The workbook had a weak flow of how the content was related to each other for the 1st 4 weeks of the semester. The flow should be as follows:

Defining and Classifying ODE 🡪 Setting up ODE 🡪 Euler’s Method 🡪 RK4 🡪 Separable equations 🡪 Technology (MATLAB)

 There was an attempt to tie all concepts into each other, but this was done more in class and not through homework. All word problem examples used are ones which students can relate to through use of real world applications, pop culture references, and common nursery rhymes.

**Workbook Spring 2018**

 The workbook was updated over the holiday break. More practice problems, clearer instructions, and emphasizing the tie in of all concepts was stronger. For example, students saw the same problems from “Setting up ODE” in the “Euler’s Method”, “RK4”, and “Separable Equations” sections. Students saw how there are multiple ways to solve the same problem.

 Updates to MATLAB commands and explanations were also updated Additional practice problems were done with MATLAB.

**Homework Fall 2017**

 I collected homework, graded, and returned with little feedback to the class. No redos were allowed.

**Homework Spring 2018**

 I collected homework, graded, and returned with major feedback to the entire class. I discussed the common errors the class made and pointed out what I was expecting of the homework. Students were allowed to do a new set of practice problems to improve their grade, if they chose to do so. This was done with two assignments. Most students took advantage of the redo.

**Clearer Expectations Spring 2018**

 The common theme for spring 2018 (1st 4 weeks) was taking more time to set the expectations of the course. What makes MAT276 different to the other calculus sequence is the real-life applications this course provides. Most engineering and physics courses (upper level) utilize differential equations. Thus, I incorporate many problems which require explanations and units instead of just a set of numbers. I took class time every day for the 1st 4 weeks to explain what was lacking and what I wanted. I did this either through reviewing homework, journals, class activities, or reviewing MATLAB assignments.

**1 Problem – Tying it all in – Fall 2017 and before**

 For approximately 2 years, I have had a problem on the exam which students had to do 6 parts to the problem. These 6 parts were my way of attempting to tie in the all the concepts for the 1st 4 weeks of the semester. While we discussed the tie in and I attempted to have some homework do this, the layout of the workbook and providing clear feedback was not helpful to students. Also, we did not spend an entire class session doing one problem with all 6 parts.

**1 Problem – Tying it all in – Spring 2018**

 With the updates to the workbook, I also spent one class period having students do one problem with all six different parts (less is more, right?). The students were able to make the connections and verify that the information they were providing was what I wanted on the exam and homework.

**Results**

 On the 1st exam, here are the observations I made for Spring 2018 (2 courses with 55 students in total) as compared to Fall 17 (1 course with 25 students) and previous semesters (1 course each semester with 32 students each, since Fall 15):

* **All** students had explanations and complete sentences for all application problems (previous semesters had approximately 80% of students doing this)
* **All** students included units with their answers (previous semesters had approximately 85% of students doing this)
* **Majority** of students (roughly 92%) were able to use MATLAB (as compared to approximately 85% in previous semesters)
* Average on 1st exam this semester was 84.5% as compared to 77% in Fall 2017 and approximately 79% for Fall 15-Spring 17
* This next claim is observational only and cannot be quantified – more students this semester are able to explain and bridge the concepts covered this far in the semester. More students have made connections to the concepts and have been able to relate the material to application problems.

Overall, the experience this semester has been excellent. I understand that I cannot say exactly what I incorporated to have a great start to the semester, but I believe the combination of all items has helped students understand what is expected of them, and this in return has helped them be more successful, thus far. I am looking forward to seeing what the rest of the semester brings.